

PATENT ABSTRACTS OF JAPAN

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(21)Application number : 06-115884 (71)Applicant : HEWLETT PACKARD CO <HP>

(22)Date of filing : 02.05.1994 (72)Inventor : SWANSON DAVID W

HAMILIN MINDY A

SALTER JAMES G

CHUNDURY DEENADAYALU

(30)Priority

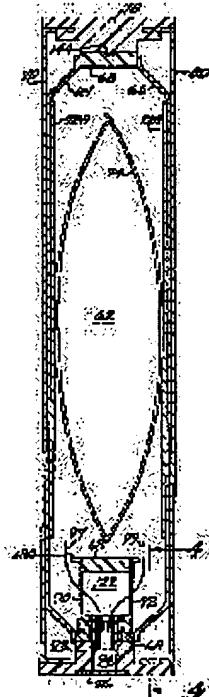
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(54) INK CARTRIDGE

(57)Abstract:

PURPOSE: To prevent a crack due to a stress, thereby preventing leakage of ink.

CONSTITUTION: An external plastic frame member 78 is formed from a comparatively rigid engineering plastic and an internal plastic frame member 68 which is formed from a copolymer mixed composition by injection molding is formed to an inner circumference of the external plastic frame member 78. An external frame structure body is constituted of the external plastic frame member 78 and internal plastic frame member 68. An ink reservoir 62 is formed in the internal plastic frame member 68. First and second ink reservoir films 64, 66 each made from ethylene-vinyl acetate are combined with the material of the internal plastic frame member 68 at the portion of the ink reservoir 62, then a leakage-resistance bonding is applied to the internal plastic frame member 68.



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(71)出願人 590000400
ヒューレット・パッカード・カンパニー
アメリカ合衆国カリフォルニア州パロアルト
ハノーバー・ストリート 3000

(72)発明者 デイヴィッド・ダヴリュ・スワンソン
アメリカ合衆国カリフォルニア州エスコン
ディド・フェリシタ・ロード 2750

(72)発明者 ミンディー・エイ・ハムリン
アメリカ合衆国カリフォルニア州サンディ
エゴ・センター・ストリート 4032

(74)代理人 弁理士 遠藤 恒

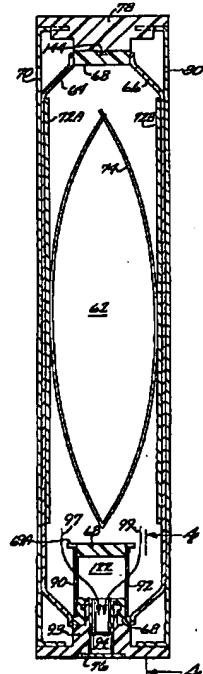
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(54)【発明の名称】 インク・カートリッジ

(57)【要約】

【目的】 応力による亀裂を防止して、インク漏洩を防止できるインク・カートリッジを提供することを目的とする。

【構成】 比較的剛いエンジニアリング・プラスチックで外部プラスチック・フレーム部材78を形成し、外部プラスチック・フレーム部材78の内周に共重合体混合組成物により射出成形した内部プラスチック・フレーム部材68を形成し、外部プラスチック・フレーム部材78と内部プラスチック・フレーム部材68とにより外部フレーム構造体60を構成し、内部プラスチック・フレーム部材68の内部にインク溜め62を形成し、インク溜め62の部分において、エチレン-ビニール・アセテートにより形成した不浸透性の第1および第2のインク溜め膜64, 66を内部プラスチック・フレーム部材68の材料と適合させて内部プラスチック・フレーム部材68に対する耐漏洩接合を行う。



【特許請求の範囲】

【請求項 1】 インク溜めを備えたプリンタ用インク・カートリッジにおいて、
第1の剛いプラスチック材料から製作された外部フレーム部材、および第2のプラスチック材料から製作された内部フレーム部材から成るフレーム構造体、
第3のプラスチック材料から形成され、前記内部フレーム部材に接合されて、前記フレーム構造体と共に、前記インク溜めを形成する第1および第2の不浸透性膜、から構成されており、
前記第2のプラスチック材料は前記第3のプラスチック材料に適合して前記不浸透性膜の前記内部フレーム部材に対する耐漏洩接合を可能としているインク・カートリッジ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は熱インクジェット（以下、T I J という）プリント・カートリッジ用インク溜めに関し、更に詳細に述べればインクジェット・プリンタの用途に有用な重合体混合組成物で形成されたインク・カートリッジに関する。

【0002】

【従来の技術】 T I J 技術はコンピュータ用プリンタに広く使用されている。非常に一般的に、T I J は典型的に幾つかの非常に小さい調節可能なインクジェットから成るプリントヘッドを備えており、これは画像または画像の一部を作り出すために、選択的に作動されてインク溜からインクの噴射または噴霧を（紙のような）印刷媒体上に放出する。T I J プリンタは、たとえば、ヒューレット・パッカード・ジャーナル・巻36、ナンバー5、1985年5月および巻39、ナンバー4、1988年8月（Hewlett-Packard Journal Vol. 36, No. 5, May 1985、およびVol. 39, No. 4, Aug 1988）に記されている。

【0003】

【発明が解決しようとする課題】 プリンタに使用されるプラスチック部品は多様な性質を示さなければならぬ。特に、プラスチック部品を作る際に使用される重合体混合物は、プリンタを構成する他の構成要素を作る際に使用される他の重合体に適合しなければならず、プリンタに使用されるインクに適合しなければならない。重合体混合物をプリンタ・カートリッジに使用するとき、重合体は重合体を化学的に攻撃する多様な材料を有するインクにさらされる。重合体がインクによって弱められると、応力亀裂によってインクの漏洩や印刷画像の汚れを生ずることがある。

【0004】 インク・カートリッジに使用される重合体混合物に関する他の問題はインク・カートリッジそれ自身を製作するのに使用される他の重合体との適合性である。普通、重合体はフィルム状に形成され、インク・カ

ートリッジを形成するように封止されている。重合体混合組成物はフィルム構造体の他にインク・カートリッジの他の重合体構成部品に対しても優れた粘着性を備えている。

【0005】 したがって、化学的攻撃および応力亀裂に耐える重合体混合組成物を設けることが望ましい。更に、インク・カートリッジの重合体構成物に適合する重合体混合組成物を設けることが望ましい。

【0006】

【課題を解決するための手段】 本発明の一つの局面によれば、インク溜めを備えたプリンタ・インク・カートリッジは第1の剛いプラスチック材料から製作された外部フレーム部材、および第1のプラスチック材料とは更に軟かく且つ更に延性があるという点で性質が異なる第2のプラスチック材料から製作された内部フレーム部材から構成されているフレーム構造体を備えている。第3の材料から形成された第1および第2の不浸透性膜が内部フレーム部材に接合されて、その部材と共に、インク溜めを形成している。第2のプラスチック材料は第3のプラスチック材料と適合して不浸透性膜の内部フレーム部材に対する耐漏洩接合を可能としている。好適に第2のプラスチック材料および前記第3のプラスチック材料は適合しているので、前記不浸透性膜を前記内部フレーム部材に対して熱および圧力を加えることにより封止することができる。

【0007】 本発明の他の局面によれば、外部プラスチック・フレーム部材は内部プラスチック・フレーム部材を取り付ける内面を備え、この内面には複数のロック用形体が形成されている。内部プラスチック・フレーム部材は溶融状態にある第2のプラスチック材料を射出成形することによって形成され、第2のプラスチック材料はその冷却時に一定の収縮率を有することを特徴としている。射出成形中、溶融材料は外部プラスチック・フレーム部材のロック用形体の周りを流れる。溶融材料が冷却すると、内部プラスチック・フレーム部材はロック用形体で外部プラスチック・フレーム部材にロックされる。

【0008】 ロック用形体は好適に、アンダカット側により形成される外部部材の表面から突出する突出リブを備えており、射出成形中、溶融している第2のプラスチック材料は突出リブの周りをアンダカット側に向って流れる。

【0009】 本発明の他の局面によれば、ペンは更に、外部プラスチック・フレーム部材およびインク溜めと連絡している内部部材を貫いて延びるインク充填ポート、および前記通路を封止する手段を備えている。好適に、通路は第2の材料により裏貼りされており、封止手段は断面が通路の直径よりわずかに大きい球である。この球は通路に圧入されて通路を封止している。

【0010】 本発明の更に他の局面によれば、本発明の

内部プラスチック・フレーム部材は（A）ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択された少くとも一つの重合体、および（B）ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された少くとも一つの重合体、から構成される重合体混合組成物から製作されており、この場合（A）は（B）とは異なるものである。

【0011】本発明の重合体組成物はインクにさらされたとき良好な化学的安定性を示す。更に、本発明の重合体組成物はその性質が半結晶性であり、柔軟性があり、他の重合体との適合性が良好である。

【0012】

【実施例】図1～図17は本発明を具体化するT I Jペン・カートリッジ50を示す。熱インクージェット・ペン・カートリッジ50は熱インクージェット・ペン・カートリッジ50の周辺を形成する閉じた帯またはループを形成する外部フレーム構造体60を備えている。外部フレーム構造体60は化学的に異なる二つの外部フレーム部材としての外部プラスチック・フレーム部材78および内部フレーム部材としての内部プラスチック・フレーム部材68から構成されている。外部プラスチック・フレーム部材78は、ゼネラル・エレクトリック社(General Electric Company)から「NORYL」（ノリル）という商標で市販されている材料のような、ガラス入り変性ポリフェニレン・オキシドのような比較的剛いエンジニアリング・プラスチックから成形される。内部プラスチック・フレーム部材68は外部プラスチック・フレーム部材78の内周に射出成形され、第1および第2のインク溜め膜64および66を取り付けるのに適するプラスチック材料から製作される。

【0013】内部プラスチック・フレーム部材68に適するプラスチックは（A）ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択された少くとも一つの重合体、および（B）ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された少くとも一つの重合体、から構成される重合体混合組成物であり、この場合（A）は（B）と異なるようにする。

【0014】更に詳細に述べれば、重合体組成物は（A）ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択されたある重合体を備えている。（A）が共重合体であり、（A）が（B）と異なるようにされる。一般に、（A）は（A）と（B）との混合物の、約60重量%または約65重量%～約90重量%または約85重量%までの量で存在している。典型的には、（A）のメルト・フロー・インデックスは約3または約5～約20または約14または約10までである。

【0015】一実施例では、（A）は低密度重合体であ

る。一般に、（A）の密度は約0.92 g/cm³である。一般に、（A）の密度は約0.80または約0.85または約0.88～約0.92または約0.91または約0.90までである。一般に、（A）の重量平均分子量Mwは約30,000または約50,000または約75,000～約500,000または約300,000または約200,000までである。他の実施例では、（A）のMw/Mn比は約1.5または約1.7または約1.8～約8まで、または約5または約4または約3までである。ここで、Mnは数平均分子量を指す。一般に、本発明人は狭い多分散性（たとえばMw/Mn比が5未満）を有する重合体は特に有効であることを発見した。

【0016】一実施例では、重合体（A）はポリエチレンであり、好適には低密度ポリエチレンであり、更に好適には超低密度である。一般に、超低密度ポリエチレンの密度は最大約0.910 g/cm³である。ポリエチレンは当業者には既知であり、市場から入手可能である。ポリエチレンの例としては、シー・ディー・エフケミ社(CDF Chemie)から市販されている商品名「ノーソフレックス・エフ・ダブリュ1900」(Norsoflex FW1900)（密度約0.900 g/cm³）、およびミシガン州ミッドランドのダウ・ケミカル・社(Dow Chemical Company)から市販されている商品名「アテイン」(Attane) 4001、4002、および4004がある。

【0017】他の実施例では、（A）はエチレンとアルファーオレフィンとの共重合体である。アルファーオレフィンは一般に、約3または約4～約18または約12までの炭素原子を含有している。有用なアルファーオレフィンの例にはノーブテン、ノーヘキセン、およびノーオクテンがある。これら共重合体は一般に、約20重量%または約30重量%または約35重量%～約90重量%または約85重量%または約80重量%までのエチレンを含有している。

【0018】共重合体は当業者に既知の手段で調製することができる。一実施例では、共重合体はメタロセン触媒を使用して作られる。メタロセン触媒は一部位触媒となる。これは側鎖分布の一様な重合体を生ずる。これは10未満という低い多分散性の重合体を生ずる。メタロセン触媒には、チタン系、ジルコニウム系、およびクロム系触媒のような遷移金属メタロセン触媒がある。典型的には、これら触媒はサイコペンタディエニル誘導体である。他の実施例では、触媒をメタロセンとアルモクサンとの反応生成物とすることができる。これら共重合体を調製するプロセスは米国特許第4,303,771号、第4,482,687号、第4,508,842号、第4,897,455号、第4,871,705号、第4,937,299号、第5,183,867号および第5,186,851号に記載されている。これ

ら特許をエチレンとアルファーオレフィンとの共重合体、メタロセン触媒、およびこれら共重合体を作る方法を目指すその教示について参考によりここに取り入れてある。

【0019】重合体組成物にはまた (B) ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された重合体がある。一般に、(B) のメルト・フロー・インデックスは約12または約20～約45または約40までである。これら重合体は典型的に (A) と (B) との混合物の約10重量%または約15重量%～約40重量%または約35重量%までの量で存在する。プロピレン均質重合体の例には商品名「シェル・ピー・ピー・5・エー・9・7」 [ShellPP5A97 (メルト・フロー・インデックス (MF I) : 4)] 、「エイーモコ・ピー・ピー・7644」 [A-moco PP 7644 (MF I : 24)] 、および「ジェネシス・エー・ピー・2・ピー・ピー・2・6・ピー」 [Genesis AP 2PP26P (MF I : 12)] がある。

【0020】一実施例では、(A) はプロピレンとエチレンとのブロック共重合体である。この実施例では、

(A) は約4重量%、または約8重量%、または約10重量%～約30重量%、または約25重量%、または約20重量%、または約15重量%までのエチレンを含有している。プロピレンとエチレンとのブロック共重合体の例には「シェル・ピー・ピー・5・シー・12」 [Shell PP5C 12 (MF I : 17)] 、およびヒモント社 (Himont) の商品名「プロファックス 7823, 85223」 (Profax 7823 および 8523) がある。

【0021】他の実施例では、(A) はプロピレンとエチレンとのランダム共重合体である。この実施例では、

(A) は一般にエチレンの約1重量%、または約4重量%～約10重量%または約7重量%まで含有している。一実施例では、エチレン含有量は約6重量%である。他の実施例では、エチレン含有量は約3重量%から約4重量%までである。

【0022】本発明を調製するのに役立つプロピレン・エチレン共重合体を調製するのに有用なプロセスは当業者に周知であり、このような多数の共重合体が市場で入手可能である。このようなランダム共重合体は、ウィリとソンズ (Wiley & Sons) 発行の重合体科学と技術の百科辞典 (Encyclopedia of Polymer Science & Engineering), 卷13、第2版 (Vol. 13, 2nd edition), 500頁以降 (およびそこに引用されている脚注) に示されているもの (これを今回は参考することにより取り入れてあるが) を含む当業者に既知の多数の方法のどれによつても調製することができる。本発明に役立つプロピレン・エチレン共重合体は市場から入手できる。これら共重合体の例にはアメリカ合衆国テキサス州ダラスのフィナ・オイルアンド・ケミカル社 (Fina Oil and Chemical Company) から入手し得る「フィナ・ワイ-8573 およ

びゼット-7650」 [Fina Y-8573 (エチレンの重量で約3%から約4%までを含有する) および Z-7650] アメリカ合衆国テキサス州ヒューストンのソルテックス・ポリマ社 (Soltex Polymer Corporation) から入手できる商品名「ソルテックス4298」 (Soltex 4298) 、レキセン社 (Rexene Corporation) から入手できる「レクセン・アール・29257」 (Rexene R 29257) およびアメリカ合衆国テキサス州ヒューストンのシェル・ケミカル社 (Shell Chemical Company) から入手することができる「シェル・ダブリュ・アール・ディー6-281」 (Shell WR D6-281) および「エス・アール・06」 [SR 06 (MF I が 32)] がある。

【0023】充填剤 (C)

上記重合体組成物は重合体技術で使用されている形式の一つ以上の充填剤を含有することができる。典型的な複合重合体混合物に使用されている充填剤の例には、タルク、炭酸カルシウム、マイカ、珪灰石、ドロマイド石灰、グラス・ファイバ、ポロン・ファイバ、カーボン・ファイバ、カーボンブラック、二酸化チタンのような顔料、またはそれらの混合物がある。好ましい充填剤はアール・ティ・バンダービルト (R. T. Vanderbilt) の、商品名「セレクト-エイソーブ」 (Select-A-Sorb) のような市場入手可能なタルク、ジェット・フィル (Jet Fil) およびガラス・ファイバがある。混合重合体に含まれる充填剤の量は重合体と充填剤との混合重量の約1%から約20%まで変り得る。一般に10%から約20%までの量が含まれている。

【0024】充填剤は結合剤で処理して充填剤と樹脂との間の結合を改善することができる。たとえば、充填剤を脂肪酸 (たとえば、ステアリン酸) 、シラン、マレート処理ポリプロピレンなどのような材料で処理することができる。使用する結合剤の量は充填剤と樹脂との間の結合を改善するのに有効な量である。

【0025】他の添加物を重合体混合物に含有させて所要の性質を変更したまたは得ることができる。たとえば、安定剤、潤滑剤、核形成剤、可塑剤、離型剤、および酸化、熱、および紫外線による劣化の抑制剤を重合体混合物に含有させることができる。

【0026】安定剤 (D) は重合体混合物の調製に際してどの段階で組成物に取り込んでもよく、好適には、安定剤を早期に取り込んで、組成物を保護することができるまで劣化が始まらないようにする。本発明の重合体混合物に役立つ酸化および熱安定剤には一般に重合体に使用されるものが含まれている。それらは、ナトリウム、カリウム、リチウム、および銅いずれかのハロゲン化物 (たとえば、塩化物、臭化物、およびヨウ化物) のような周期律表第一属の金属ハロゲン化物、干渉フェノール、ヒドロキノン、亜りん酸塩アリル、およびそれら材料の各種置換誘導体、およびそれらの混合物を、重合体混合物の重量を基礎として、最大約1重量%だけ含有し

ている。干渉フェノール安定剤の特定の例には商標名「Irganox」（例えはIrganox 1010、Irganox 1076、およびIrganox B-225）としてチバーガイギ社（Ciba-Geigy）から市販されている干渉フェノールの一族がある。Irganox 1010はテトラキス[メチレン(3,5-ジエターブチル-4-ヒドロキシ)ヒドロシナメート]メタンであると報告されている。Irganox 1076はn-オクタデシル-3-(3,5-ジエターブチル-4-ヒドロキシフェニル)プロピオネートである。Irganox B-225は、Irganox 1010とUltranox 168（芳香性亜りん酸塩）の混合物である。

【0027】紫外線安定剤は重合体混合物の重量を基礎として最大約2重量%の量で含有されることができる。紫外光安定剤の例には種々の置換レゾルシノル、サリチル酸塩、ベンゾトリアゾール、ベンゾフェノンなどがある。或る用途に対して、この材料から作った成形部品を部分的にまたは完全に紫外光に曝露することができる。

【0028】適切な潤滑剤および離型剤を、ステアリン酸、ステアリンアルコール、ステアルアミドのような材料を含有する重合体混合物の重量を基礎として最大約1重量%の量で含有することができる。

【0029】重合体混合物の調整

混合重合体組成は当業者に周知の方法により調整することができる。たとえば、特に有用な手順は、製粉機、バンパリ、プラベンド、単独または二連のねじ押出機、連続ミキサ、捏和（ねっか）機などの伝統的な溶融混合設備を用いて重合体を親密に混合することである。たとえば、重合体を高剪断ミキサ内で細粒および/または粉末の形で親密に混合することができる。混合重合体

を調製する好適な一つのプロセスはファレル連続処理器（Farrell Continuous Processor）CP-23、CP-45およびCP-57を利用していている。短い滞留時間および高い剪断がCP-23、CP-45、およびCP-57で容易に得られる。「親密な」混合とは混合物が細かく分割され且つ連続相または主要相の中に均質に分散される分散相を生ずるのに充分な機械的剪断および熱エネルギーを用いて調製されることを意味する。

【0030】本発明の種々の特徴および局面が以下の例で更に図解されている。これらの例は当業者に本発明の範囲内で操作する仕方を示しているが、それらはそのような範囲が特許請求の範囲でのみ規定される本発明の範囲を限定する働きをするものではない。更に、以下の例では、混合物、複合物、射出成形試料、単層または積層のシートの調製法を例示する。これらの例は本発明の例示実施例としての働きをするだけであって、限定するものと考えるべきではない。

【0031】次の例において他に指示しない限り、および明細書および特許請求の範囲のどこにおいても、部分および百分率はすべて重量により、温度は摂氏の度により、圧力は大気圧でまたはその近くである。

【0032】例1～4

本発明の混合重合体組成物を上記Farrell Continuous Processor C-23で、ミキサ回転速度600 rpmで調製し、ペレットにする前に約200℃で、水槽および空気ワイパを通過しているより糸の中に押し出す。

【0033】

【表1】

	1	2	3	4	5	4
ポリプロピレン (1)	21.9 0	---	---	---	10.5	0
エチレン-2プロピレン 共重合体 (2)	---	24.9	28.40	39.9	19.9	14.0
超低密度 ポリエチレン (3)	---	---	70.05	---	---	---
エチレン- アルファ オレフィン 共重合体 (4)	78.0 0	74.9 5	---	60.0 0	80.0 0	74.3 0
安定剤 (5)	0.10	0.10	0.10	0.10	0.10	0.10

(1). 「シェル・ピー・ピー・5・エー・97」 (Shell PP5A97)(MFI は4)

(2). 「シェル・エス・アール・ディー354」 (Shell SRD354)(MFI は12)

(3). Dow Chemical Companyの「アテイン 4002」 (Attane 4002)

(4). Exxon Chemical Companyの「エクサクト 4041」 (Exxact 4041)

(5). Ciba-Geigyの「イルガノックス・ピー・225」 (Irganox B-225)

は約30, 000である。

【0034】上の重合体組成物は、オーエン・カーニン

グ・ファイバ・グラス社(Owens Corning Fiber·glass)から入手できるOCF144A、492、および457BAのようなガラスファイバのような、充填剤と混合することもできる。有用な重合体混合物は上の例の各々でOCF457BAの重合体組成物の10重量%混合することにより調製することができる。

【0035】本発明の重合体組成物はインクージェット・プリンタで使用するもののような、プリンタ・カートリッジを準備するのに役立つ。重合体組成物はインクに適合しており、化学的および溶媒の攻撃に耐える。重合体組成物は応力亀裂耐性が向上している。重合体組成物はまた良好な処理性質を示し、良好な成型可能性および流動性を有している。

【0036】これら重合体組成物はプリンタに代表的に使用される重合体および重合体混合物への有利な接着性を備えている。本発明の重合体組成物はポリエチレンおよびフェニレン・エーテルとポリスチレンの重合体合金の両者に対する予期せぬ良好な接着性を示す。たとえば、ポリスチレン単位の約25重量%から約50重量%までを典型的に含有しているポリスチレンおよびポリフェニレン・エーテルから成る混合物はジェネラル・エレクトリック社(General Electric Company)から商標名「NORYL™」(ノイル)の熱可塑性樹脂として市場で入手できる。このような混合物の分子量は約10, 000から約50, 000までの範囲にあり、更に多くの場合

【0037】本発明の重合体組成物はまた熱的に安定である。重合体組成物はプリンタの動作条件のもとで安定である。

【0038】外部フレーム構造体60は全般的に直線の開いた塊状領域110および塊状領域110の一隅から突出する鼻領域75を形成している。外部プラスチック・フレーム部材78は成形されて、中に内部開口または溝94(以下、溝94という)が形成されている直立管93を形成する。直立管の溝94は溝94の外端を横断して固定されているT I Jプリントヘッド76と連絡している。インクは直立管の溝94を通って流れ、T I Jプリントヘッド76にインクを供給する。インクの小滴がプリントヘッド・ノズルを通して外側に押し出されると、インクは直立管93を通ってインク溜め62から全般に矢印97および99で示してある流体経路を経由して流れ、T I Jプリントヘッド76に利用可能なインク供給を補給する。

【0039】内部プラスチック・フレーム部材68は更に鼻領域75ののどを横断して突出している支持リブ120を備え、鼻領域を主インク溜め区域62から分離している。全般的に長方形の室区域122が支持リブ120と直立管の溝94の内部開口との間に突出する内部プラスチック・フレーム部材68の包囲構造により形成されている。

【0040】第1および第2のインク溜め膜64および

6 6 が熱かしめ、接着剤、または他の結合プロセスにより内部プラスチック・フレーム部材 6 8 に取り付けられ、内部プラスチック・フレーム部材 6 8 と第 1 および第 2 のインク溜め膜 6 4 および 6 6 との間に耐漏洩封止を形成している。第 1 および第 2 のインク溜め膜 6 4 および 6 6 はインク溜め 6 2 の内部に貯蔵しようとするインクに対して不浸透性で且つ内部プラスチック・フレーム部材 6 8 を製作する材料のプラスチックと適合する材料で作られている。第 1 および第 2 のインク溜め膜 6 4 および 6 6 に好適な材料はエチレンービニル・アセテート (EVA) である。インク分配システムは 2 枚の対向ピストン板 7 2 A および 7 2 B に対して分離力を供給するばね 7 4 をインク溜め 6 2 の内側に備えて第 1 および第 2 のインク溜め膜 6 4 および 6 6 を分離している。ばねおよびピストン要素はインク溜めの中のインクにかかる圧力を負に維持し、インクが T I J プリントヘッド 7 6 からあふれないようにしている。インクがインク溜めから消費されるにつれて第 1 および第 2 のインク溜め膜 6 4 および 6 6 にかかる大気圧がばねの圧縮を生じ、ピストン板 7 2 A および 7 2 B を互いの方に引きつける。

【0041】第 1 および第 2 のインク溜め膜 6 4 および 6 6 は直立管領域にわたって広がっており、この実施例では縁領域 6 8 A、6 8 B、および 6 8 C (図 5) に沿って熱かしめされ、鼻領域 7 5 の周辺に沿う膜の封止を維持している。第 1 および第 2 のインク溜め膜 6 4 および 6 6 は支持リブ 1 2 0 の領域に対しては封止していない。内部プラスチック・フレーム部材 6 8 を構成する隔壁 6 9 A および 6 9 B は第 1 および第 2 のインク溜め膜を支持リブ 1 2 0 の区域から離して保持し、第 1 および第 2 のインク溜め膜が支持リブ構造に向ってたるまないようにし、これによりインク溜めから直立管 9 3 までのインクの流れを閉め切っている。

【0042】空気止め弁が T I J プリントヘッド 7 6 とインク溜め 6 2 との間の流路に設けられ、気泡が T I J プリントヘッド 7 6 からインク溜め 6 2 に進入しないようにしている。この空気止め弁は粒子汚染物がインク溜め 6 2 から T I J プリントヘッド 7 6 に流れて T I J プリントヘッドのノズルを詰まらせることのないようにするフィルタの機能を行なう。この実施例では、空気止め弁は内部プラスチック・フレーム部材 6 8 の両側に一つづつ二つの弁部材 9 0、9 2 を備えている。弁部材 9 0 および 9 2 は各々、この模範的実施例では、精密に織られたステンレス鋼の網の一部分から構成され、その縁は内部プラスチック・フレーム部材に取り付けられている。網は隣接する網より線の間に公称 1 5 ミクロンの通路寸法を備えており、弁部材を成す網の典型的な厚さは 0. 0 0 5 インチ未満である。この実施例では、各弁部材 9 0 および 9 2 は正方形で、約 1 cm × 1 cm の面積を覆っている。オレゴン州ユージーン (Eugene) のイングル・ツール・アンド・ダイ (Engle Tool and Die) から商

標名「RIGIMESH-J」 (リギメッシュ・ジェイ) のもとに市販されている網が逆止め弁の機能を行うのに適している。網の通路の大きさは、インクが網の通路を通過することができる間、通常大気圧下の気泡がインクで濡れている網の通路を通過しないよう充分小さい。気泡に網を通過させるのに必要な気泡の圧力は、この実施例では、水柱約 3 0 インチであるが、これは典型的な貯蔵、ハンドリング、および動作の各状態のもとでペン・カートリッジ 5 0 が受ける圧力より充分高い。その結果、網は該ペン・カートリッジ 5 0 に対する空気止め弁の機能を行う。

【0043】網による弁部材により実現される第 2 の機能は粒子フィルタの機能であり、1 5 ミクロンもの小さい粒子が網を通過しないようにする。通気型の泡入りインク溜めの粒子フィルタにこの網目開口の大きさの、網を使用することは既知である。このようなインク溜めには空気止め弁の必要はない。

【0044】網による弁部材 9 0 および 9 2 を横断して圧力降下が存在する。網開口の大きさが小さ過ぎれば、網を通って流れるインクが不充分になり、T I J プリントヘッドが空房状態になる。二つの弁部材 9 0 および 9 2 は充分なインクがインク溜め 6 2 から溝 9 4 に確実に流入するように採用されている。

【0045】図 4 および図 5 は T I J ペン・カートリッジ 5 0 の鼻領域 7 5 を示す。図 4 は図 3 の線 4-4 に沿って取った断面図である。図 5 はカバーおよび弁部材 9 0 および 9 2 が所定位置に無い鼻領域の図である。外部プラスチック・フレーム部材 7 8 は 1 対の内向きに対抗するタブ 7 8 A および 7 8 B を備えており、これは鼻領域 7 5 の内周の周りに成形された内部プラスチック・フレーム部材 6 8 の部分に対する支持を行う。タブ 7 8 A および 7 8 B は内部プラスチック・フレーム部材 6 8 を成形するためのコア形体としても役立つ。内部プラスチック・フレーム部材 6 8 は室区域 1 2 2 を形成しており、内部プラスチック・フレーム部材 6 8 の直線部分が室区域 1 2 2 の周辺の周りに広がっている。その内部プラスチック・フレーム部材は縁領域 6 8 A ~ 6 8 D により形成されている。図 3 に示すように、内部プラスチック・フレーム部材 6 8 の幅は室区域 1 2 2 の幅を規定している。縁領域 6 8 A ~ 6 8 D はしたがって内部プラスチック・フレーム部材 6 8 の各カバー対向側に室区域 1 2 2 への窓を形成している。カバー 7 0 および 8 0 の平面に垂直に広がる室区域 1 2 2 の各側面は内部プラスチック・フレーム部材 6 8 を構成するプラスチックにより形成されている。

【0046】動作中、気泡が室区域 1 2 2 の中に蓄積することがある。T I J ペン・カートリッジ 5 0 を設置しているプリンタは T I J プリントヘッドに真空を加えて気泡を T I J プリントヘッドを通して引き出し、インクをインク溜めから引き出して直立管の溝および室区域 1

22を満たすためのプライミング・ステーションを備えることができる。このようなプライミングステーションは当業者には既知である。

【0047】内部プラスチック・フレーム部材68は縁領域68A～68Dから突出して内部プラスチック・フレーム部材68の周辺の周りに広がる薄いリップ124を形成するように成形される。このようなリップ124は内部プラスチック・フレーム部材68の各カバー対向側に形成される。リップ124だけを図5で見ることができる。網スクリーンによる弁部材を取り付けるのに行われる熱かしめ操作中、加熱された型部材は弁部材上方に設置され、弁部材に向って下向きに力で押される。型部材の温度はリップ124を形成するプラスチック材料を軟化または溶融させるに充分であるから、溶融プラスチックの幾らかは弁部材を成す網の隣接隙間に流入する。型部材を除去し、プラスチックを冷却すると、弁部材は室区域122への窓の周辺全部の周りで内部プラスチック・フレーム部材68にしっかりと取り付けられる。

【0048】図6～図9はTIJペン・カートリッジ50のインク充填ポート130の位置および構造を示す。図6に示すように、この実施例では、インク充填ポート130はTIJペン・カートリッジの鼻領域75に隣接する外部フレーム構造体60の平らな平面60Aに設けられている。インク溜めにはインク充填ポート130を経由してインクが詰められ、インク充填ポート130はその後ステンレス鋼球132を挿入することにより封止される。

【0049】外部プラスチック・フレーム部材78は円形断面の開口を形成するように成形されるが、その開口の直径はステンレス鋼球132が支持される領域134の小さい方の直径から平面60Aに隣接する領域136の大きい方の直径まで急激に移り変わっている。この実施例では、ステンレス鋼球132の直径は0.187インチ(4.76mm)であり、外部プラスチック・フレーム部材78の領域134での小さい方の直径は0.236インチ(6.0mm)であり、外部プラスチック・フレーム部材78の領域136での大きい方の直径は0.283インチ(7.2mm)である。

【0050】内部プラスチック・フレーム部材68をあらかじめ製作した外部プラスチック・フレーム部材78の中に成形する期間中、溶融プラスチックは外部プラスチック・フレーム部材78にインク充填ポートとして形成された開口を通り、そこに挿入された成形ピンの周りを流れてない内部プラスチック・フレーム部材68からなる充填ポート構造を形成する。このようにして、溶融プラスチックは領域134で外部プラスチック・フレーム部材78を形成する材料の周りを流れ、その上に裏貼りを形成する。その上、このように形成された内部プラスチック・フレーム部材68はインク溜め62と連絡するインク充填ポート130を形成する。インク充填ポート130の直径は表面に隣接する開口の第1の直径から、ステンレス鋼球132の直径より実質上小さいインク溜め62に隣接する138での第2の、小さい直径までテープをなしている。この模範的実施例では、第1の直径は0.179インチであり第2の直径は0.120インチである。

【0051】インク溜め62にインクを詰めるには、TIJペン・カートリッジが鼻領域75を図6に示すように垂直位置にして保持する。インク充填針がインク充填ポート130を通してインク溜めの中に下り、ほとんどインク溜めの底に接触するようになる。これはインクが可能な最短距離落下するように行われる。それはインクが落下すれば幾らかのインクが泡立ち、それにより後のプライミングが困難になるからである。次にTIJペン・カートリッジのインク溜めに吸上げ手段によりインク充填針を通してインク溜めの中のインクがインク充填ポートの内側にほとんど接触する点までインクを詰める。この点でインク充填針をペンから引き出し、ステンレス鋼球132をインク充填開口の上に置く。ステンレス鋼球は、インク充填ポート130を取り囲むプラスチック材料の幾らかを変位させなければならないから、インク充填ポートに対するその大きさのため開口138の中にしっかりと嵌まる。ステンレス鋼球132を次に工具140(図9)をインク充填ポート130の底の開口138で工具が丁度内径に接触するように押すことによりインク充填ポート130に押し込む。この点でインクはTIJペン・カートリッジのインク溜めに入っているが、インクの自由表面の上からプリントヘッド・ノズルを通る空気経路が存在し、これはTIJペン・カートリッジの最初の背圧を確保するためには除去しなければならない。

【0052】空気は、TIJペン・カートリッジ50を最高点が鼻領域75であるように30度の角度傾けた状態でTIJペン・カートリッジから抜き取られる。これは空気がそのとき鼻領域である最高点まで浮動し、それにより空気をプライマによりTIJペン・カートリッジから抜き取りやすくなるため行われる。次に吸込みヘッドをTIJペン・カートリッジのノズル領域上方に設置し、真空引きする。真空が空気を除去するにつれて、インクのレベルは上がり、弁部材を成す網によるフィルタを完全に濡らし、最後にはその進路がプリントヘッド・ノズルまでおよびそれ全体に進む。このプロセスは既知量のインクがノズルを通して引かれ、TIJペン・カートリッジの初期背圧を水柱の-1インチに確保するように特徴づけられている。TIJペン・カートリッジを発射準備させてから、プリントヘッドの上面をきれいな水および空気ナイフを用いて洗い、プライミング・プロセスからの余剰インクを除去する。TIJペン・カートリッジを発射準備し終ってからは、勿論、TIJペン・カートリッジがインクをTIJペン・カートリッジ内に保

持した状態でどんな向きにも回転させることができる。

【0053】図10および図11はT I Jペン・カートリッジ50を構成する外部プラスチック・フレーム部材78を孤立して示す。特に、図11で、外部プラスチック・フレーム部材78が外部平坦面142を呈示しているが、外部プラスチック・フレーム部材78の内側面は外部プラスチック・フレーム部材78の厚さを増大させる幾つかの階段を呈示し、プラトー146を形成していることがわかる。リブ形体144がプラトー146から突出する外部プラスチック・フレーム部材78の中心に沿って形成され、アンダカット側面144Aおよび144Bを備えている。リブ形体144は図10に示すように、外部プラスチック・フレーム部材78の側面の一部またはほとんど全部に沿って広がっている。

【0054】図12は図10に対応する側面図であるが、外部プラスチック・フレーム部材78の上に成形された内部プラスチック・フレーム部材68を示している。外部プラスチック・フレーム部材78はプラトー146に沿って広がり、リブ形体144を覆っている。リブ形体のアンダカット側は内部プラスチック・フレーム部材68を内部プラスチック・フレーム部材68にロックするロッキング手段となる。この実施例で、内部プラスチック・フレーム部材68の厚さはT(0.059インチ)であり、図13に示す区域での幅はW(0.354インチ)である。全般に外部プラスチック・フレーム部材78に垂直に延びる内部プラスチック・フレーム部材68の側面148および150は第1および第2のインク溜め膜64および66を取り付けることができる表面となっている。

【0055】内部プラスチック・フレーム部材68を形成する材料は溶融状態から冷却するとき、収縮率を備えている。この材料は外部プラスチック・フレーム部材78の内側に成形され、冷却するにつれて外部プラスチック・フレーム部材78から離れるように収縮する傾向がある。内部プラスチック・フレーム部材68を外部プラスチック・フレーム部材78に取り付けたままにしておくには、内部プラスチック・フレーム部材68を外部プラスチック・フレーム部材78の一部として成形されているアンダカットのリブ形体144の上に成形する。内部プラスチック・フレーム部材68を形成する材料が冷却するにつれて、これらリブ形体144により外部プラスチック・フレーム部材78の上にロックされ、それにより内部プラスチック・フレーム部材68を形成する材料の力に逆らって、その材料の収縮により外部プラスチック・フレーム部材78から引き離される。図示のロック用のリブ形体144は成形しやすい単純な断面を備えている。

【0056】軟かいポリオレフィン混合体を内部プラスチック・フレーム部材68の材料として使用することができる。それはこのポリオレフィン混合体がNORYL材料

の表面に化学的に接着し、且つ非常に低い(NORYLの2.5ミル/インチにほぼ等しい)収縮率を備えているので収縮過程中に生ずる力が、たとえば、約20ミル/インチである純ポリエチレンより低いからである。

【0057】図14および図15は鼻領域にある内部プラスチック・フレーム部材68および外部プラスチック・フレーム78の構造を更に詳細に示す。内部プラスチック・フレーム部材68の材料はタブ78Aおよび78Bの上を流れ、直立管93を覆い、リブ93Aにロックされる。

【0058】図16は図6の線16-16に沿って取った断面図である。インク溜めを形成する要素をここで見ることができる。内部プラスチック・フレーム部材68の対向側面148および150へのばね袋膜である第1および第2インク溜め膜64および66の取付けが示されている。図17は特に第2インク溜め膜66の内部プラスチック・フレーム部材68の側面148への熱かしめ取付けを示す拡大図である。熱かしめそれ自体はプラスチック業界で周知である。

【0059】図18および図19は、リブ形体144の代りを、外部プラスチック・フレーム部材78の内面に形成することができるロック形体の代りの二つの実施例を示す。したがって、図18はロック形体144a、すなわち内部プラスチック・フレーム部材68aを成形するとき溶融プラスチックが流入する開口160を有する実質上小さいハンドル状形体、を採用している外部プラスチック・フレーム部材78aを示している。図19は丸いアンダカット開口162が形成されているロック形体144aを備えた外部プラスチック・フレーム部材78aを示している。溶融プラスチックは内部プラスチック・フレーム部材68aを成形するときアンダカット開口162に流入する。

【0060】内部プラスチック・フレーム部材68を外部プラスチック・フレーム部材78に成形する方法は引用した米国特許出願番号第07/853,372号に記されている。手短かに述べれば、変性ポリフェニレン・オキシド、すなわち、第1の成形材料の外部プラスチック・フレーム部材78をプラスチック射出成形により製作する。この外部プラスチック・フレーム部材78を「第1ショット」という。第1ショットを次に第2の型に注入し、ここで第2の成形材料がその上に成形される。この「第2ショット」は冷却されると或る程度収縮する。

【0061】T I Jペン・カートリッジ50のフレームを構成する二つの材料の長所は内部プラスチック・フレーム部材68を、該ペン・カートリッジ50を落とした場合に、幾らか減衰材としても働く、外部プラスチック・フレーム部材78のエンジニアリング・プラスチックより軟かい、延性のある材料(ポリオレフィン混合体のような)から作ることができるということである。これ

は亀裂、膜の破れ、および他の損傷を防止する傾向がある。その上、内部プラスチック・フレーム部材68の軟かい、延性のある材料は、エンジニアリング・プラスチックよりゴムに似ているが、応力亀裂を生じ難い。内部プラスチック・フレーム部材68を製作するのにポリオレフィンのようなポリエチレン系の材料を使用すれば、水分透過率が低いという更に別の利益があり、それによりインク溜めの中のインクの中味を漏洩または蒸発に逆らって維持し、T I Jペン・カートリッジに使用するインクを構成する化学薬品との化学的適合性を維持する。フィルタとしての弁部材90および92を、エンジニアリング・プラスチックとは対照的に、内部プラスチック・フレーム部材68に対するこのような材料に容易に取り付けることができる。というのはポリオレフィン系の材料は熱かしめ温度が低く、材料がフィルタの網に漏入しやすく、それにより内部プラスチック・フレーム部材68と空気逆止め弁/弁部材90および92との間に確実な接合が行われる。

【0062】内部プラスチック・フレーム部材68および内部プラスチック・フレーム部材78の成形時、T I Jプリントヘッド76とフィルタ要素すなわち、弁部材90および92との間のT I Jペン・カートリッジの区域をプリントヘッドのノズルを詰まらせるに充分な大きさの粒子汚染が全くないようにしておく必要がある。引用した係属中の米国特許出願番号第07/853, 872号に記されているようなT I Jペン・カートリッジのインサート成形の場合に、直立管室を形成するコアピンは外部プラスチック・フレーム部材78を形成する第1ショットの材料と係合し、封止を、内部プラスチック・フレーム部材68を形成する圧力下にある溶融している第2ショットの材料を取り込まないようにしておくのに充分きつくする必要がある。直立管93の内側でのコアピンの係合は、係合の作用が第1ショットの材料の壁を磨り減らし、後に残って汚染の発現を生ずる粒子を生ずる可能性があるから、汚染源である。コアピンの遮断および拭き取りの区域は図20に示すコアピン170の設計により極小になっている。この設計では、内部プラスチック・フレーム部材68を形成する第2ショットの材料は部分的に直立管の溝94の内側を裏貼りさせられて拭き取り作用を少くしている。図20は共に外部プラスチック・フレーム部材78の上に持つて来て鼻領域75で内部プラスチック・フレーム部材の第2ショット成形用型の空洞を形成する二つの半型174および176を示す。溝ピン172は半型を横断して嵌まっている。型空洞ピンとしてのコア・ピン170は直立管の溝内に挿入され、その先端は溝ピン172に形成された凹部の中に受けられている。コア・ピン170はテーパになっていてコア・ピンと外部プラスチック・フレーム部材78に形成された直立管の溝との間の肩170Aの上方に円環状空間を形成している。コア・ピン170は肩170

Aの下の直立管の溝内にしっかりと嵌まり、第2ショットの材料が成形中区域の栓領域170Bに流入しないようにする栓領域170Bを形成している。このピン構成により第2ショット材料が円環状空間に流入して、直立管の内部を下方に栓領域170Bまで覆う裏貼りを形成することができる。外部プラスチック・フレーム部材78の表面79Aおよび79Bは半型の表面が接触する遮断面としても役立ち、第2ショット材料が表面79Aおよび79Bと半型との間の接合を通じて流れないようにする。

【0063】汚染の問題を可能な限り小さくする他の方法は第1ショットの外部プラスチック・フレーム部材78の第2ショット機の型への装入を自動化することである。この自動化はロボット装入機を使用するが、これは外部プラスチック・フレーム部材を成形に先立ち第2ショットの型に設置する成形産業においては慣習的なことである。外部プラスチック・フレーム部材を手で、自動フィーダシステムによりロボット装入機に装入することができ、または外部プラスチック・フレーム部材を第1ショット成形機から拾い出してそれらを第2成形機に設置するにロボットを使用することができる。オートメーションのこれらの使用はすべて部品をきれいにしておくのに役立つ一層良好な調節環境を考えている。

【0064】この二材料すなわち、外部プラスチック・フレーム部材、内部プラスチック・フレーム部材は、一方の成形機が第1の材料を成形する手段を備え、その成形したばかりのショットを第2材料のバレルに対する所定位置に移動し、次いで第2材料を成形して部品を完成する2ショット成形法によって作ることもできる。このような2ショット成形プロセスは当業界では既知である。

【0065】上述の成形では、高い方の溶融温度を有する材料、外部プラスチック・フレーム部材78のエンジニアリング・プラスチック、を第1ショットで先づ成形して外部プラスチック・フレーム部材78を形成する。低い方の溶融温度を有する材料、ポリオレフィン混合体またはポリエチレン系材料を既に成形されている外部プラスチック・フレーム部材を使用して第2ショットの型の空洞を形成するのを補助して、内部プラスチック・フレーム部材68を次に形成する。代りに、この成形プロセスを逆にし、溶融温度が高い方の材料をインサート成形プロセスで溶融温度が低い方の材料の上に成形することができる。内部プラスチック・フレーム部材68と外部プラスチック・フレーム部材78との間のインターロック形体を第1ショット、すなわち、内部プラスチック・フレーム部材68の上に二つの材料を共にロックするのに充分なアンダカットを用いて形成する。型の温度は低温度の第1ショットの溶融点の近くまたは下に止めておく必要がある。或るエンジニアリング・プラスチックの場合には、これによりそれらを成形するのが更に困難

になる可能性がある。また、第2ショットのプラスチックは型の中において第1ショットのプラスチックの上に成形されるので、第1ショットはプラスチックの境界面に沿って溶融する。成形条件は第1ショットがその完全性を維持し、境界面に沿って影響を受けるだけであり、且つ第2ショットを第1ショットの上に成形するとき洗い流されないようになっていることでなければならぬ。

【0066】図21はT1Jペン・カートリッジ50の直立管の区域でのこのようなインサート成形プロセスを示している。内部プラスチック・フレーム部材68が第1ショットの型で最初に成形される。次に、第2ショットの型表面の幾らかを形成するのに内部プラスチック・フレーム部材68の表面を使用して、外部エンジニアリング・プラスチックの外部プラスチック・フレーム部材78を内部プラスチック・フレーム部材68の上に成形する。コア・ピン180および型キャップ182は内部直立管の溝および直立管区域の上面を形成している。エンジニアリング・プラスチックの184の外側リングを第1ショット・プラスチックの内部プラスチック・フレーム部材68の上に形成し、内部プラスチック・フレーム部材68の低温度材料を圧縮する圧縮リングを第2ショットにより形成された内側直立管の上に形成する。第2ショットの材料が冷却するにつれて、第1ショット材料を直立管を形成する186で第2ショットに向って第1ショット材料を圧縮する。

【0067】図22は、低い方の温度の材料を最初に成形した状態の、直立管に対する代りのインサート成形構成を示す。ここでは第2ショットは直立管を取り囲む低温度材料の周りに圧縮リングを形成しないので、二つの材料の間の結合は単に、第2ショット材料が境界面を溶融し、低温度材料を最後に成形する場合より良好な結合を生ずるのを助けるときに支援される2材料間の化学的結合によっている。この場合には、第2ショットは型を埋めるにつれて冷却され、第2ショット材料の温度の方が高いことおよびその熱容量のため、接合に沿うすべての区域内でこの場合に可能であるほど熱くない。しかし、図21の構成は図22のものより優れている。というのは前者の構成は化学的および機械的の両方の封止を生ずるからである。

【0068】低温度プラスチック材料の上の高温度材料のこのようなインサート成形プロセスには幾つかの長所がある。主な利益は直立管の区域にある。第2ショットのエンジニアリング・プラスチック材料の成形では、T1Jプリントヘッドへの直立管開口を成形するコア・ピン180は成形後第2ショットから後退するだけではなく、したがって上述の摩耗の問題はない。この場合型キャップ182は後退しなければならず、これは摩耗を生ずる可能性があるが、それが後退する穴は全く同じコア・ピンにより形成されているので、コア・ピンと直立管と

の間の嵌合は非常に正確で、エンジニアリング・プラスチックが第1ショット材料である場合より摩耗は少くなる。その場合には、コア・ピンが第1ショットの型から、次いで外部プラスチック・フレーム部材78が型から排出され、収縮し、外部プラスチック・フレーム部材が処理され、直立管のゆがみを生ずる。最後に、別の直立管コア・ピンを用意して外部プラスチック・フレーム部材78の直立管の溝に押し込む。温度の低い方の材料を最初にインサート成形する現在の場合には、第1ショットの材料はコア・ピン180に接触しない。この方法の他の利点は第2ショットのエンジニアリング・プラスチックが冷却するにつれて、それが内部の第1ショット材料の上に収縮してきつい接合を生ずるにもかかわらず、エンジニアリング・プラスチックを最初に形成する2ショット法では、第2ショットの自然収縮は直立管から遠い接合の区域で第1ショットから引き離される傾向があるということである。

【0069】内部プラスチック・フレーム部材68および外部プラスチック・フレーム部材78を製作するのに使用することができる他の成形プロセスは温度の高い方のエンジニアリング・プラスチック材料を温度の低い方のポリオレフィンの上に成形する2成形プロセスである。温度の低い方の材料を温度の高い方の材料の内側に成形すると、米国特許出願番号第07/853,372号に記されているように、第1ショットの部分をそこから収縮して離れ、ゆるくなる傾向があるコアの内側に運ばなければならない。この新しい2ショット成形プロセスでは、第1ショットをその上にしっかりと収縮するコアの上に成形し、次いで第2ショットを第1ショットの上に成形し、第2ショットも第1ショットの上にきつく収縮する。

【0070】図23はT1Jペン・カートリッジの鼻領域の代りの実施例を、内部プラスチック・フレーム部材68をエンジニアリング・プラスチックの内部プラスチック・フレーム部材68の上に成形する前の形で示している。鼻領域75cで、外部プラスチック・フレーム部材78cは、直立管を通じて外部プラスチック・フレーム部材78cの外面に形成された開口まで延びている内部開口である溝ぞ94cが形成されている内部の、直立した流体直立管93cを形成している。インクがインク溜めから、鼻領域に設置されることになるT1Jプリントヘッドまで流れるのはこの溝を通してである。

【0071】図23は外部プラスチック・フレーム部材78cの内部で上向きに突出する流体の直立管93cを取り囲む開放領域202を示す。1対の離して設けられたリブ93Acおよび93Bcが直立管93の外側面から突出している。支柱204が鼻領域75cののどを横断して形成されている。

【0072】今度は図24を参照すると、外部プラスチック・フレーム部材78cが内部プラスチック・フレー

ム部材 6 8 c が外部プラスチック・フレーム部材 7 8 c の内面に成形されている状態で図示されている。内部プラスチック・フレーム部材を形成する材料は、溝 9 4 c を覆わずに、直立管 9 3 c の周辺に成形されており、ばね袋フィルム膜であるインク溜め膜をかしめることができる表面を提供している。

【0073】上述の実施例は本発明の原理を表現することができる可能な特定の実施例の単なる例示であることが理解される。当業者は本発明の範囲および精神から逸脱することなくそれらの原理に従って他の構成を容易に推察することができる。

【0074】以上本発明の各実施例について詳述したが、ここで本発明の各実施例の理解を容易にするために、各実施例ごとに要約して以下に列挙する。

【0075】1. インク溜めを備えたプリンタ用インク・カートリッジにおいて、第1の剛いプラスチック材料から製作された外部フレーム部材、および第2のプラスチック材料から製作された内部フレーム部材から成るフレーム構造体、第3のプラスチック材料から形成され、前記内部フレーム部材に接合されて、前記フレーム構造体と共に、前記インク溜めを形成する第1および第2の不透性膜、から構成されており、前記第2のプラスチック材料は前記第3のプラスチック材料に適合して前記不透性膜の前記内部フレーム部材に対する耐漏洩接合を可能としているインク・カートリッジである。

【0076】2. 前記第2のプラスチック材料は(A)ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択された少くとも一つの重合体、および(B)ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された少くとも一つの重合体から構成される重合体混合組成物から構成され、(A)と(B)とは異なるものである前記1に記載のインク・カートリッジである。

【0077】3. 前記2に記載の(A)は低密度ポリエチレンである。

【0078】4. 前記2に記載の(A)はエチレンと約4から約18までの炭素原子を有するアルファーオレフィンとの共重合体である。

【0079】5. 前記2に記載の(B)はプロピレンとエチレンとのランダム共重合体である。

【0080】6. 前記2に記載の(B)のメルト・フロー・インデックスは約3から約4.5である。

【0081】7. 前記2に記載の(A)は約60重量%から約90重量%までの量で存在し、前記2に記載の(B)は約10重量%から約40重量%までの量で存在し、この場合の重量百分率は(A)と(B)とを混合したものを基準としている。

【0082】8. 更に前記2に記載の重合体混合組成物には(C)充填剤を含めることができる。

【0083】9. 更に前記2に記載の重合体混合組成物には(d)安定剤を含めることができる。

【0084】10. 前記1に記載の第2のプラスチック材料は(A)エチレンと約4から約18までの炭素原子を有するアルファーオレフィンとの共重合体、および(B)プロピレンとエチレンとのランダム共重合体の少くとも一つ、から成る重合体混合組成物から構成されているインク・カートリッジである。

【0085】11. 前記1に記載の第2のプラスチック材料は(A)低密度ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択された少くとも一つの重合体の約65重量%から約85重量%、および(B)ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された少くとも一つの重合体の約15重量%から約35重量%、から構成された重合体混合組成物から構成されており、この場合重合体のメルト・インデックスは約5から約15であり、(A)は(B)とは異っているものであるインク・カートリッジである。

【0086】12. プリンタのインク・カートリッジ・ペン用の第1と第2との成形し得る材料の間に耐漏洩接合を形成する方法であって、前記第1の材料を内部直立管部材の外周を形成する空洞を備えた所定の第1の構造体の中に成形する工程、前記第1の構造体を型の中に設置して前記第2の成形し得る材料を注入する工程、溶融状態にある前記第2の成形し得る材料を前記型に注入する工程であって、この場合前記第2の材料は前記空洞の外周を埋め、前記第1の構造体に対して成形して前記直立管部材の外周を形成する工程、前記第2の成形し得る材料を冷却させ、それにより前記直立管部材の周りの前記第1の材料と第2の材料との間に耐漏洩封止を形成する工程によって成されてる。

【0087】13. 前記第2の成形し得る材料は、(A)ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択された少くとも一つの重合体、および(B)ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された少くとも一つの重合体、から構成された重合体混合組成物から構成されており、この場合(A)と(B)とは異なるものである前記12に記載の方法である。

【0088】14. 第1の剛いプラスチック材料から作られた外部フレーム構造部材、および前記外部部材の一部を裏貼りする第2のプラスチック材料から作られた内部フレーム部材から成るフレーム構造体から構成されているプリンタのインク・カートリッジを製作する方法であって、前記第1の材料はこの材料の冷却時に一定の収縮率を有することを特徴としている方法において、前記第2の材料を前記内部裏貼り部材内に射出成形する工程、前記内部裏貼り部材を型の中に設置し、前記外部フ

レーム部材を前記内部部材の周りに射出成形する工程であって、前記内部部材の表面は前記第1の材料を注入することになる型空洞の一部を形成する工程、溶融状態にある前記第1の材料を前記型および前記内部部材により形成されている前記型空洞内に注入する工程、前記第1の材料を冷却させ、前記第1の材料は前記内部部材の周りに収縮して前記外部部材が前記内部部材の周りにきっちり合うようにする工程、から構成される方法である。

【0089】15. 前記第2のプラスチック材料は(A)ポリエチレンおよびエチレンとアルファーオレフィンとの共重合体から成るグループから選択された少くとも一つの重合体、および(B)ポリプロピレンおよびプロピレンとエチレンとの共重合体から成るグループから選択された少くとも一つの重合体、から構成される重合体混合組成物から構成されており、この場合(A)と(B)とは異なるものである前記14に記載の方法である。

【0090】

【発明の効果】以上のように、本発明によれば、第1の剛いプラスチック材料による外部フレーム部材と第2のプラスチック材料による内部フレーム部材とによりフレーム構造体を構成し、第3のプラスチック材料による不透性膜を内部フレーム部材に接合してフレーム構造体とともにインク溜めを形成し、内部フレーム部材の第2のプラスチック材料が第3のプラスチック材料と適合して内部フレーム部材に対して耐漏洩接合を行うように構成したので、不透性膜を内部フレーム部材に対して熱および圧力を加えて封止が可能となり、化学的および熱や圧力に起因する応力による亀裂を防止することができ、確実にインクの漏洩を防止することができる。

【図面の簡単な説明】

【図1】本発明を実施するT I Jペン・カートリッジの斜視図であり、そのカバーを破断した形で示してある。

【図2】図1のT I Jペン・カートリッジの鼻領域の拡大図である。

【図3】T I Jペン・カートリッジの鼻領域を通して長さ方向に取った図1のT I Jペン・カートリッジの断面図である。

【図4】図1のT I Jペン・カートリッジの鼻領域の破断面図である。

【図5】空気止め弁の設置前に取った、図1のT I Jペン・カートリッジの鼻領域の側面図である。

【図6】図1のT I Jペン・カートリッジの斜視図である。

【図7】図6の線7-7に沿って取った断面図である。

【図8】図7の線8-8に沿って取った断面図である。

【図9】図7と同様の断面図であるが、封止球の挿入を示している。

【図10】図1のT I Jペン・カートリッジを構成する外部プラスチック・フレーム部材の側面図である。

【図11】図10の線11-11に沿って取った断面図である。

【図12】図1のT I Jペン・カートリッジを構成する外部および内部プラスチック・フレーム部材の側面図である。

【図13】図12の線13-13に沿って取った断面図である。

【図14】図12の線14-14に沿って取った断面図である。

【図15】図12の線15-15に沿って取った断面図である。

【図16】図6の線16-16に沿って取った断面図である。

【図17】図16の円17の内部の領域の拡大図である。

【図18】図1のT I Jペン・カートリッジを構成する外部プラスチック・フレーム部材に内部プラスチック・リフレーム部材をロックする代りの方法を示す斜視図である。

【図19】図1のT I Jペン・カートリッジを構成する外部プラスチック・フレーム部材に内部プラスチック・リフレーム部材をロックするさらに別の方法を示す斜視図である。

【図20】直立管開口の第2ショット裏貼りの成形を示す断面図である。

【図21】図1のT I Jペン・カートリッジを構成する外部および内部プラスチック・フレーム部材を形成する代りの方法を示す断面図である。

【図22】図1のT I Jペン・カートリッジを構成する外部および内部プラスチック・フレーム部材を成形するさらに別の方法を示す断面図である。

【図23】外部プラスチック・フレーム部材のT I Jペン・カートリッジの鼻領域の代りの実施例を示す破断面図である。

【図24】外部プラスチック・フレーム部材のT I Jペン・カートリッジの鼻領域の代りの実施例を示す側面図である。

【符号の説明】

50 T I Jペン・カートリッジ

60 外部フレーム構造体

62 インク溜め

64 第1のインク溜め膜

66 第2のインク溜め膜

68, 68a, 68b, 68c 内部プラスチック・フレーム部材

76 T I Jプリントヘッド

78, 78b, 78c 外部プラスチック・フレーム部材

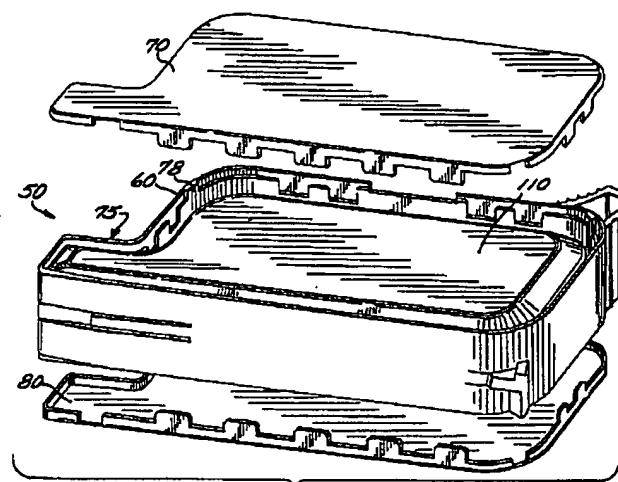
90, 92 弁部材

93, 93c 直立管

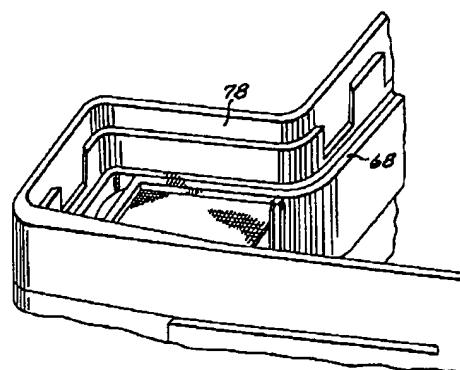
120 支持リブ
130 インク充填ポート

132 ステンレス鋼球

【図1】

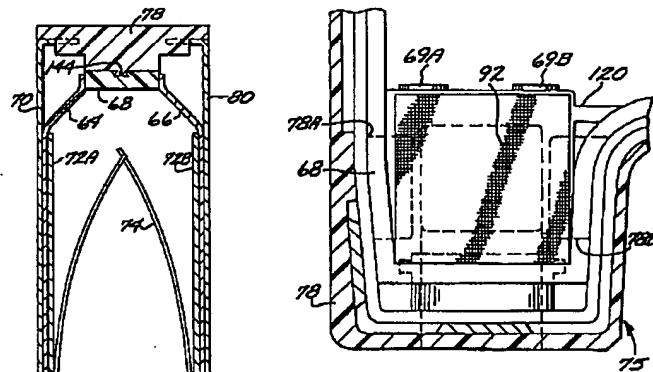


【図2】

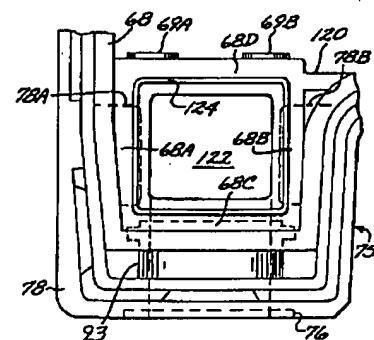
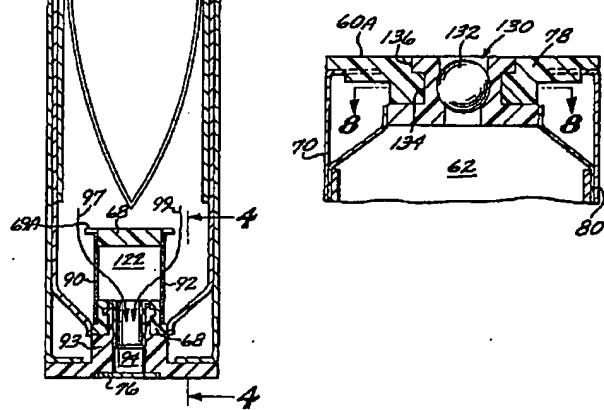


【図3】

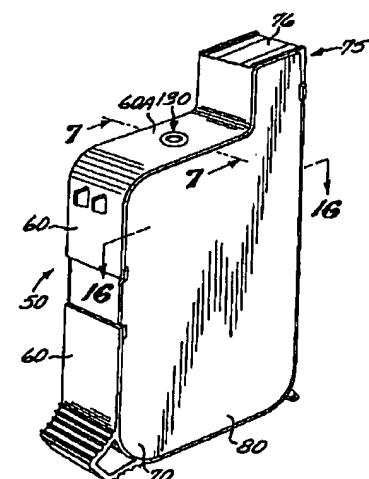
【図4】



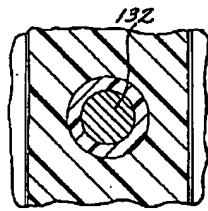
【図7】



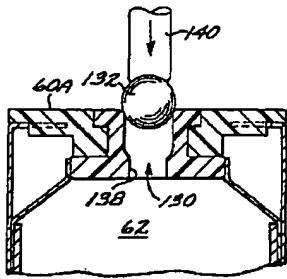
【図5】



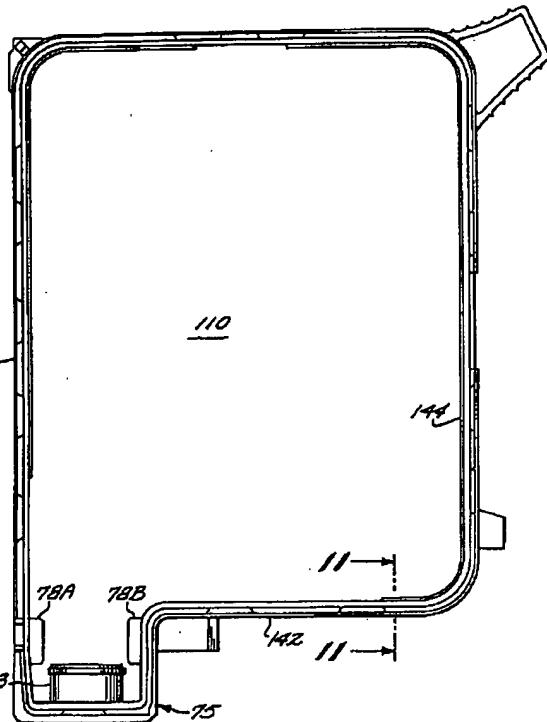
【図 8】



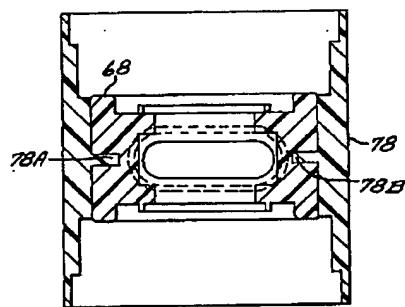
【図 9】



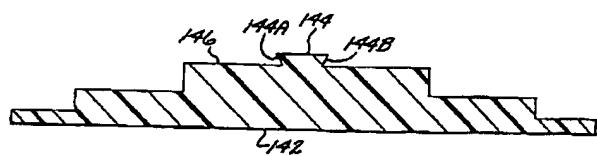
【図 10】



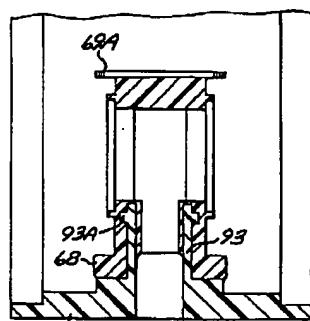
【図 15】



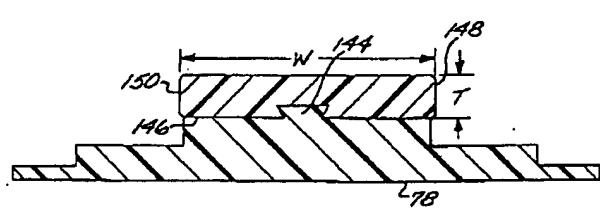
【図 11】



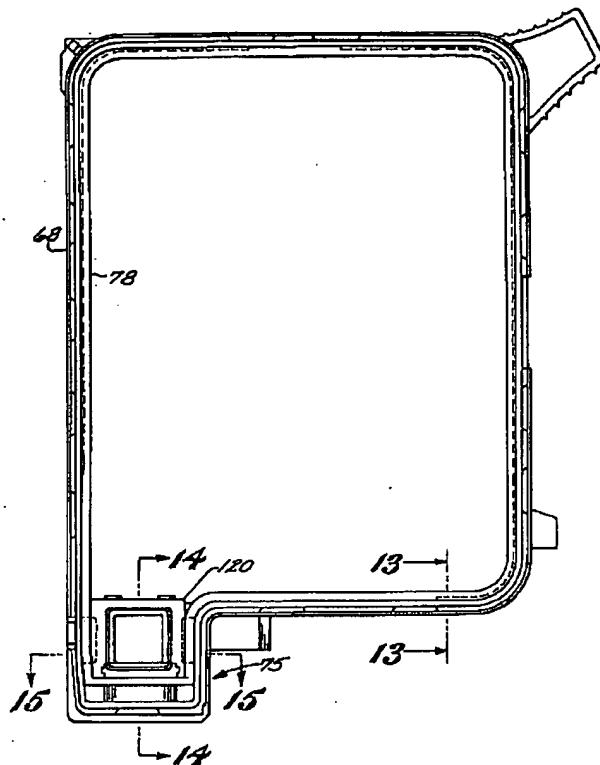
【図 14】



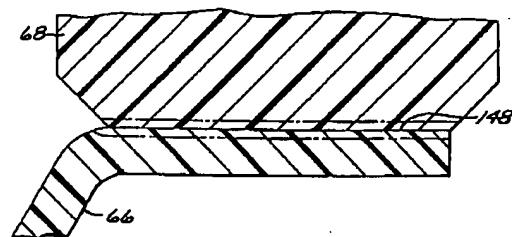
【図 13】



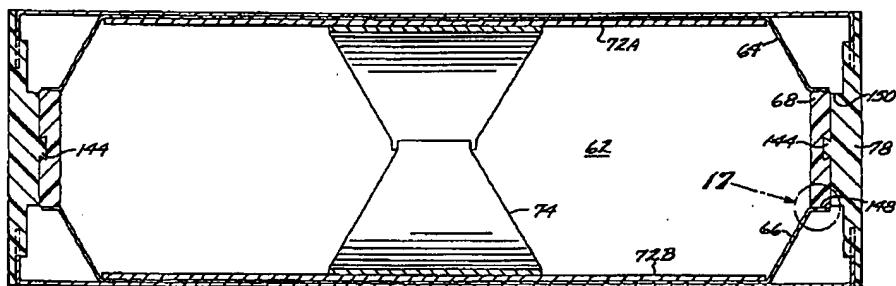
【図12】



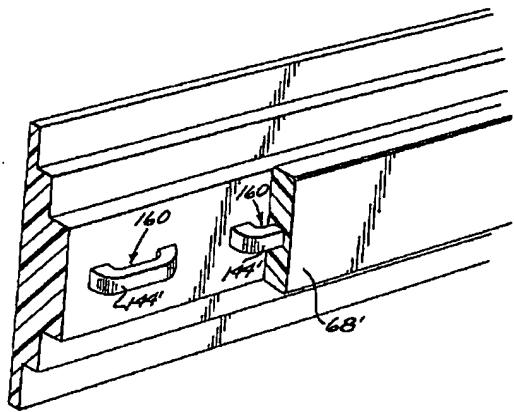
【図17】



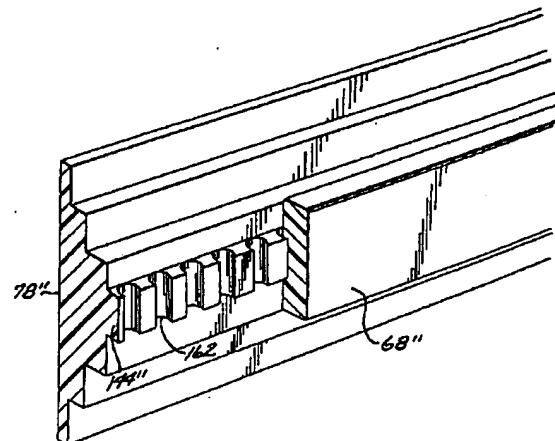
【図16】



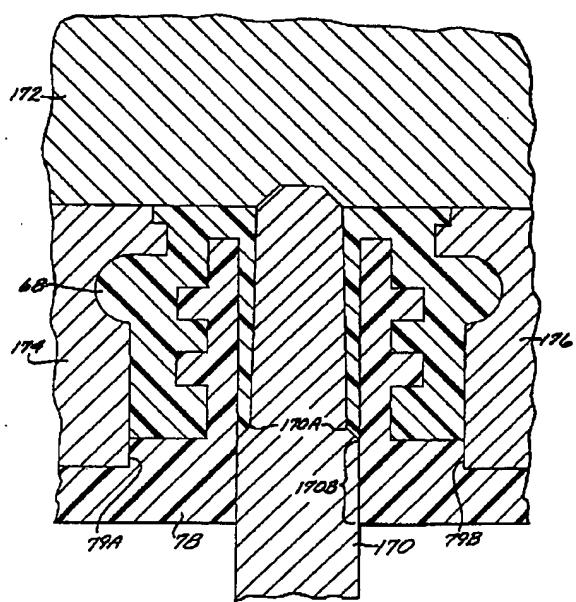
【図18】



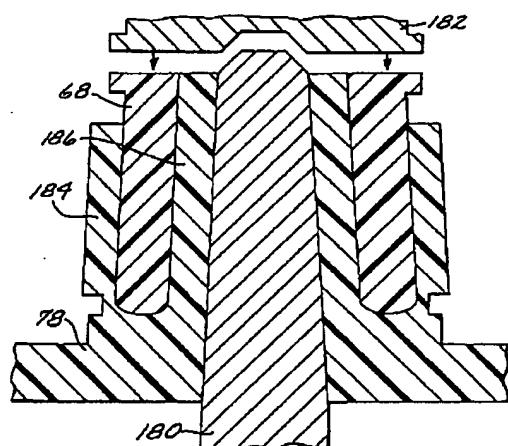
【図19】



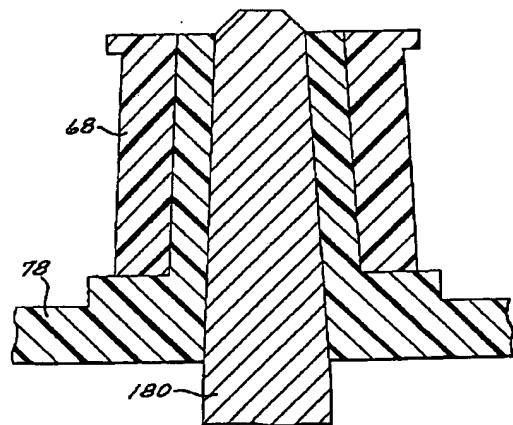
【図20】



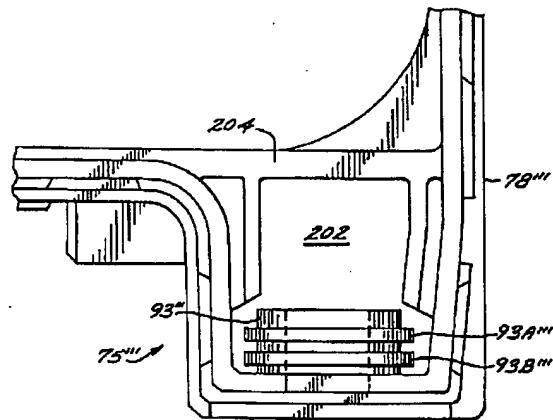
【図21】



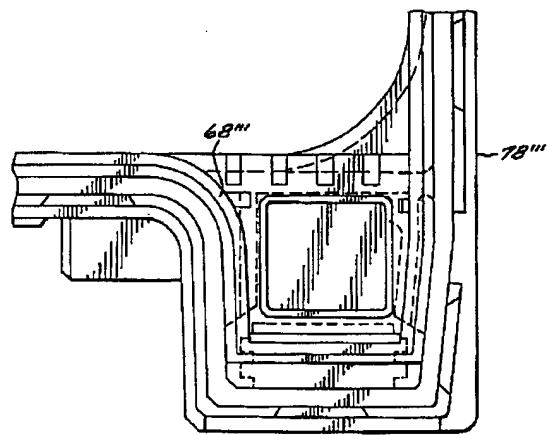
【図22】



【図23】



【図24】



フロントページの続き

(72)発明者 ジェームズ・ジー・サルター
アメリカ合衆国カリフォルニア州サクラメント
イー・ストリート 2429

(72)発明者 ディーナダヤル・チャンデュリー
アメリカ合衆国インディアナ州ニューバーガー
ヒルスゲート・コート 6600

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. **** shows the word which can not be translated.

3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The outer-flame member manufactured from the 1st **** plastic material in the ink cartridge for printers equipped with the ink reservoir, It is formed from the frame structure object and the 3rd plastic material which consist of the inner flame member manufactured from the 2nd plastic material, and is joined to said inner flame member. And with said frame structure object the 1st which forms said ink reservoir, and the 2nd impermeable film -- since -- the ink cartridge which it is constituted, and said 2nd plastic material suits said 3rd plastic material, and is enabling leakage-proof junction over said inner flame member of said impermeable film.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] About the ink reservoir for heat ink jet (henceforth TIJ) print cartridges, this invention relates to the ink cartridge formed in the application of an ink jet printer with the useful polymer mixing constituent, if it states to a detail further.

[0002]

[Description of the Prior Art] The TIJ technique is widely used for the printer for computers. Very generally, TIJ is equipped with the print head which consists of the ink jet in which some very small accommodation is typically possible, and in order to make some of images or images, this operates selectively and emits injection or the fuel spray of ink on print media (it is (like paper)) from ink **. The TIJ printer is described in the Hewlett Packard journal and Maki 36, number May, 1985 [5 or] and, Maki 39, and number August, 1988 [4 or] (Hewlet-Packard Journal Vol.36, No.5, May1985 and Vol.39, No.4, and Aug1988).

[0003]

[Problem(s) to be Solved by the Invention] The plastic part used for a printer must show various properties. Especially the polymer mixture used in case a plastic part is made must suit other polymers used in case other components which constitute a printer are made, and must suit the ink used for a printer. When using polymer mixture for a printer cartridge, a polymer is exposed to the ink which has the various ingredients which attack a polymer chemically. When a polymer can weaken in ink, leakage of ink and the dirt of a printing image may be produced by stress cracking.

[0004] Other problems about the polymer mixture used for an ink cartridge are compatibility with other polymers used for manufacturing ink cartridge itself. The polymer is usually closed so that it may be formed in the shape of a film and an ink cartridge may be formed. The polymer mixing constituent is equipped with the adhesiveness which was excellent to other polymer component parts of an ink cartridge besides the film structure.

[0005] Therefore, it is desirable to prepare the polymer mixing constituent which bears a chemical attack and stress cracking. Furthermore, it is desirable to prepare the polymer mixing constituent which suits the polymer structure of an ink cartridge.

[0006]

[Means for Solving the Problem] According to one aspect of affairs of this invention, the printer ink cartridge equipped with the ink reservoir is equipped with the frame structure object which consists of an outer-flame member manufactured from the 1st **** plastic material, and an inner flame member manufactured from the 2nd plastic material with which a property differs from the 1st plastic material in that there is ductility still more softly and further. It is joined to an inner flame member and the 1st and 2nd impermeable film formed from the 3rd ingredient forms the ink reservoir with the member. The 2nd plastic material suits with the 3rd plastic material, and is enabling leakage-proof junction over the inner flame member of the impermeable film. Since the 2nd plastic material and said 3rd plastic material conform suitably, said impermeable film can be closed by applying heat and a pressure to said inner flame member.

[0007] According to other aspects of affairs of this invention, an external plastics frame frame member is equipped with the inner surface which attaches an internal plastics frame member, and two or more forms for a lock are formed in this inner surface. An internal plastics frame member is formed by carrying out injection molding of the 2nd plastic material in a melting condition, and the 2nd plastic material is characterized by having fixed contraction at the time of the cooling. A melting ingredient flows the surroundings of the form for a lock of an external plastics frame member among injection molding. When a melting ingredient cools, an internal plastics frame member is locked by the external plastics frame member with the form for a lock.

[0008] The form for a lock is equipped with the projection rib which projects suitably from the front face of the external member formed of an undercut side, and the 2nd fused plastic material flows the surroundings of a projection rib toward an undercut side among injection molding.

[0009] According to other aspects of affairs of this invention, the pen is equipped with a means to close the ink restoration port which pierces through the internal member connecting with an external plastics frame member and an ink reservoir further, and extends, and said path. Suitably, the path is back-****(ed) by the 2nd ingredient and a closure means is a ball with a slightly larger cross section than the diameter of a path. This ball is pressed fit in a path and is closing the path.

[0010] At least one polymer which was chosen from the group to whom the internal plastics frame member of this invention changes from the copolymer of (A) polyethylene and ethylene, and an alpha-olefin according to the aspect of affairs of further others of this invention, and at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene -- since -- it is manufactured from the polymer mixing constituent constituted, and (A) differs from (B) in this case.

[0011] The polymer constituent of this invention shows chemical stability with the good time of being exposed to ink. Furthermore, the property is semicrystallinity, the polymer constituent of this invention is supple and its compatibility with other polymers is good.

[0012]

[Example] Drawing 1 - drawing 17 show the TIJ pen cartridge 50 which materializes this invention. The heat ink jet pen cartridge 50 is equipped with the outer-flame structure 60 which forms the closed band which forms the circumference of the heat ink jet pen cartridge 50, or a loop formation. The outer-flame structure 60 consists of internal plastics frame members 68 as the external plastics frame member 78 and inner flame member as two chemically different outer-flame members. the external plastics frame member 78 is like denaturation polyphenylene oxide containing glass like the ingredient marketed with the trademark "NORYL" (noryl), from General Electric (General Electric Company) -- it is comparatively fabricated from a **** engineering plastic. The inner circumference of the external plastics frame member 78 injection molds the internal plastics frame member 68, and it is manufactured from the plastic material suitable for attaching in the 1st and 2nd ink reservoir film 64 and 66.

[0013] at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group to whom the plastics suitable for the internal plastics frame member 68 changes from the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene -- since -- it is the polymer mixing constituent constituted and is made for (A) to differ from (B) in this case

[0014] Furthermore, the polymer constituent is equipped with a certain polymer chosen from the group who consists of the copolymer of (A) polyethylene and ethylene, and an alpha-olefin if it states to a detail. (A) is a copolymer and it is made for (A) to differ from (B). Generally, (A) exists in the amount to about 60% of the weight of the mixture of (A) and (B), about 65 % of the weight - about 90 % of the weight, or about 85 % of the weight. Typically, the melt flow index of (A) is to about 3 or about 5 - abbreviation 20, about 14, or about 10.

[0015] In the one example, (A) is a low consistency polymer. general -- the consistency of (A) -- about 0.92 g/cm3 it is . Generally, the consistency of (A) is to about 0.80, about 0.85 or 0.88 - abbreviation 0.92, about 0.91, or about 0.90. Generally, the weight average molecular weight Mw of (A) is to about 30,000, about 50,000 or about 75,000 - abbreviation 500,000, about 300,000, or about 200,000. In other examples, the Mw/Mn ratio of (A) is to about 1.5, about 1.7 or about 1.8 - abbreviation 8, or about 5, about 4 or about 3. Here, Mn points out number average molecular weight. Generally, it discovered that especially the polymer with which this invention people have narrow polydispersity (for example, a Mw/Mn ratio is less than five) was effective.

[0016] In the one example, a polymer (A) is polyethylene, is low density polyethylene suitably, and is a super-low consistency still more suitably. general -- the consistency of super-low density polyethylene -- a maximum of -- about 0.910 g/cm3 it is . To this contractor, polyethylene is known and available from a commercial scene. as the example of polyethylene -- C dee EFUKEMI (CDF Chemie) from -- there are the trade name "NOSO flex time EFU W 1900" (Norsoflex FW1900) (consistency about 0.900 g/cm3) marketed and trade name "ATEIN" (Attane) 4001 which are marketed from the Dow Chemical and the company of Michigan Midland (Dow Chemical Company), and 4002 and 4004.

[0017] In other examples, (A) is the copolymer of ethylene and an alpha-olefin. Generally the alpha-olefin contains about 3 or about 4 - abbreviation 18, or the carbon atom to about 12. There are a no butene, a no hexene, and no octene in the example of a useful alpha-olefin. Generally these copolymers contain the ethylene to about 20 % of the weight, about 30 % of the weight, about 35 % of the weight - about 90 % of the weight, about 85 % of the weight, or about 80 % of the weight.

[0018] A copolymer can be prepared with a known means to this contractor. A copolymer is made from one example using a metallocene catalyst. Some metallocene catalysts turn into a catalyst. This produces the uniform polymer of side-chain distribution. This produces the polymer of low polydispersity called less than ten. There are a titanium system, a zirconium system, and a transition-metals metallocene catalyst like a chromium system catalyst as metallocene catalyst. Typically, these catalysts are bupleuri radix pen TADI enyl derivatives. A catalyst can be used as the resultant of a metallocene and ARUMOKUSAN in other examples. The process which prepares these copolymers is indicated by U.S. Pat. No. 4,303,771, No. 4,482,687, No. 4,508,842, No. 4,897,455, No. 4,871,705, No. 4,937,299, No. 5,183,867, and No. 5,186,851. It has taken in by reference here about the instruction which aims at the approach of making the copolymer of ethylene and an alpha-olefin, a metallocene catalyst, and these copolymers for these patents.

[0019] There is a polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene again in a polymer constituent. Generally, the melt flow index of (B) is to about 12 or about 20 - abbreviation 45, or about 40. These polymers exist typically in the amount to about 10% of the weight of the mixture of (A) and (B), about 15 % of the weight - about 40 % of the weight, or about 35 % of the weight. the example of a propylene homogeneity polymer -- a trade name -- ""shell Py Py, 5 and A, 9, 7 [ShellPP five A97 (melt flow index (MFI): 4)]", "ray-MOKO Py Py and 7644" [A-moco PP 7644 (MFI:24)], and Genesys A Py, 2, Py Py, 2, 6 and Py" [Genesis AP2PP26P (MFI:12)] have.

[0020] In the one example, (A) is the block copolymer of a propylene and ethylene. In this example, (A) contains the ethylene to about 4 % of the weight, about 8 % of the weight, about 10 % of the weight - about 30 % of the weight, about 25 % of the weight, about 20 % of the weight, or about 15 % of the weight. There is a trade name "the pro facsimile 7823 and 85223" (Profax 7823 and 8523) of "shell Py Py, 5 and C and 12" [Shell PP5C 12 (MFI:17)] and Himont (Himont) in the example of the block copolymer of a propylene and ethylene.

[0021] In other examples, (A) is the random copolymer of a propylene and ethylene. Generally in this example, (A) is contained to about 1% of the weight of ethylene, about 4 % of the weight - about 10 % of the weight, or about 7 % of the weight. In the one example, an ethylene content is about 6 % of the weight. In other examples, an ethylene content is from about 3 % of the weight to about 4 % of the weight.

[0022] To this contractor, a process useful although the propylene ethylene copolymer which is useful to preparing this invention is prepared is common knowledge, and is available in a commercial scene. [of the copolymer of such a large number] Such a random copolymer The various-subjects lexicon of a wheelie, the polymer science of SONZU (Wiley & Sons) issuance, and a technique (Encyclopedia of Polymer Science & Eng-ineering), Maki 13, the 2nd edition (Vol.13, 2nd edition), It can prepare also by which of many known approaches to this contractor containing what is shown after 500 page (and footnote quoted there) (it has taken in by referring to this this time). The propylene ethylene copolymer which is useful to this invention can come to hand from a commercial scene. the example of these copolymers -- the Fina oil and the chemical company (Fina Oil and Chemical Company) of American Texas Dallas from -- Fina Wai -8573 and "ZETT -7650" [Fina [which may receive] Y-8573 (from about 3% to about 4% by the weight of ethylene) The trade name which can contain and come to hand from the SORUTEKKUSU polymer company (Soltex Polymer Corporation) of Z-7650] United States of America Texas Houston "SORUTEKKUSU 4298" (Soltex4298), ShellChemical () of "the

REKUSEN R and 29257" (RexeneR 29257) and American Texas Houston which can come to hand from Rexene (Rexene Corporation) [Shell] There are "shell W Earl Dee 6-281" (Shell WR D 6-281) who can obtain from Chemical Company, and "an S R and 06" [SR06 (MFI is 32)].

[0023] Bulking agent (C)

The above-mentioned polymer constituent can contain one or more bulking agents of the format currently used with the polymer technique. Talc, a calcium carbonate, a mica, wollastonite, dolomite lime, a glass fiber, a boron fiber, a carbon fiber, carbon black, pigments like a titanium dioxide, or those mixture are in the example of the bulking agent currently used for typical compound polymer mixture. a commercial scene [like the trade name "selection-ray-SOBU" (Select-A-Sorb) of R tee Vanderbilt (R. T.Vanderbilt)] whose desirable bulking agent is -- there are available talc, Jet Phil (Jet Fil), and a glass fiber. The amount of the bulking agent contained in a mixed polymer may change from about 1% to about 20% of the mixed weight of a polymer and a bulking agent. Generally the amount from 10% to about 20% is contained.

[0024] A bulking agent can be processed with a binder and can improve association between a bulking agent and resin. For example, a bulking agent can be processed with ingredients, such as a fatty acid (for example, stearin acid), a silane, and maleate processing polypropylene. The amount of the binder to be used is an amount effective in improving association between a bulking agent and resin.

[0025] Polymer mixture is made to contain other additives, and a necessary property can be changed or acquired. For example, polymer mixture can be made to contain a stabilizer, lubricant, a nucleation agent, a plasticizer, a release agent and oxidation, heat, and the inhibitor of degradation by ultraviolet rays.

[0026] A stabilizer (D) may be incorporated to a constituent in any phase on the occasion of preparation of polymer mixture, and it is made incorporate a stabilizer at an early stage, and for degradation not to start suitably, until it can protect a constituent. What is generally used for a polymer is contained in the oxidation and the thermostabilizer which are useful to the polymer mixture of this invention. a metal halogenide [like sodium, a potassium, a lithium, and the halogenide (for example a chloride, a bromide, and an iodide) of one of copper] of the first group of the periodic table whose they are, an interference phenol, a hydroquinone, a phosphite allyl compound, the various permutation derivatives of these ingredients, and those mixture -- a foundation [weight / of polymer mixture] -- carrying out -- a maximum of -- it contains only about 1% of the weight. There is the whole family of the interference phenol marketed from CHIBAGAIGI (Ciba-Geigy) as a brand name "Irganox" (a metaphor is Irganox 1010, Irganox 1076, and Irganox B-225) in the specific example of an interference phenol stabilizer. It is reported that Irganox 1010 is tetrakis [methylene (3, 5-Jeter-butyl-4-hydroxy) hydronium cinae flos mate] methane. Irganox 1076 is n-octadecyl-3-(3, 5-Jeter-butyl-4-hydroxyphenyl) propionate. Irganox B-225 are the mixture of Irganox1010 and Ultranox168 (fragrance phosphite).

[0027] UV stabilizer can be contained in the amount of about 2 % of the weight of the maximum on the basis of the weight of polymer mixture. There are various permutation REZORUSHINORU, salicylate, benzotriazol, a benzophenone, etc. in the example of an ultraviolet radiation stabilizer. The shaping components made from this ingredient can be exposed to ultraviolet radiation selectively or thoroughly to a certain application.

[0028] Suitable lubricant and a suitable release agent can be contained in the amount of about 1 % of the weight of the maximum on the basis of the weight of the polymer mixture containing

stearin acid, stearin alcohol, and an ingredient like stearamide.

[0029] The adjustment mixed polymer presentation of polymer mixture can be adjusted to this contractor by the well-known approach. For example, especially a useful procedure is mixing a polymer intimately using a flour mill, Banbury, Brabender, and an independent or traditional melting mixing facility of the screw-thread extruder of 2 reams, a continuous mixer, a kneading (kneading) machine, etc. For example, a polymer is intimately mixable in the form of a fine grain and/or powder within a high shearing mixer. One suitable process of preparing a mixed polymer uses Farel consecutive-processing machine (Farrell Continuous Processor) CP-23, CP-45, and CP-57. The short residence time and high shearing are CP-23, CP-45, and CP-57. It is obtained easily. "Intimate" mixing means being prepared using sufficient mechanical shearing and heat energy producing the dispersed phase which mixture is divided finely and distributed by homogeneity in a continuous phase or a primary phase.

[0030] Various descriptions and aspects of affairs of this invention are further illustrated in the following examples. Although these examples show this contractor how to operate it within the limits of this invention, they do not serve for such range to limit the range of this invention specified only by the claim. Furthermore, in the following examples, the method of preparation of the sheet of mixture, a composite, an injection-molding sample, a monolayer, or a laminating is illustrated. It should not be thought that these examples only carry out the work as an instantiation example of this invention, and limit it.

[0031] Otherwise in the following example, it points, and as long as there is nothing, in anywhere of a description and a claim, the pressure of all of a part and a percentage is atmospheric pressure by whenever [of Centigrade] in weight, or temperature is near it.

[0032] Before preparing the mixed polymer constituent of one to example 4 this invention by mixer rotational-speed 600rpm and making it into a pellet by above-mentioned Farrell Continuous Processor C -23, it extrudes in yarn at about 200 degrees C rather than it has passed the cistern and the air wiper.

[0033]

[A table 1]

	1	2	3	4	5	4
ポリプロピレン (1)	21.9 0	---	---	---	10.5	0
エチレン-2プロピ レン	---	24.9	28.40	39.9	19.9	14.0
共重合体 (2)				0	0	0
超低密度 ポリエチレン (3)	---	---	70.05	---	---	---
エチレン- アルフ ア オレフィン 共重合体 (4)	78.0 0	74.9 5	---	60.0 0	80.0 0	74.3 0
安定剤 (5)	0.10	0.10	0.10	0.10	0.10	0.10

- (1). 「シェル・ピー・ピー・5・エー・97」 (Shell PP5A97) (MFI は4)
- (2). 「シェル・エス・アール・ディー-354」 (Shell SRD354) (MFI は12)
- (3). Dow Chemical Companyの「アテイン 4002」 (Attane 4002)
- (4). Exxon Chemical Companyの「エクサクト 4041」 (Exxact 4041)
- (5). Ciba-Geigyの「イルガノックス・ピー・225」 (Irganox B-225)

[0034] The upper polymer constituent is also mixable with a bulking agent like glass fiber like OCF(s) 144A and 492 which can come to hand from the Owen kerning fiberglass company (Owens Corning Fiber-glass), and 457BA. Useful polymer mixture can be prepared when the polymer constituent of OCF457BA is mixed 10% of the weight in each of the upper example.

[0035] Although the polymer constituent of this invention is used with an ink jet printer, it is useful to preparing a printer cartridge [like]. The polymer constituent conforms to ink and is equal to the attack of chemical and a solvent. Stress-cracking resistance of a polymer constituent is improving. A polymer constituent shows a processing property good again, and has good molding possibility and a good fluidity.

[0036] These polymers constituent is equipped with the advantageous adhesive property to the polymer and polymer mixture which are typically used for a printer. The polymer constituent of this invention shows the unexpected good adhesive property to both of the polymer alloy of polyethylene, and the phenylene ether and polystyrene. For example, the mixture which consists of the polystyrene and polyphenylene ether which contain typically from a polystyrene unit [about 25% of the weight of] to about 50 % of the weight can come to hand as thermoplastics of a brand name "NORYL TM" (noil) from a general electric company (General Electric Company) in a commercial scene. The molecular weight of such mixture is in the range from about 10,000 to about 50,000, and, in further many cases, it is about 30,000.

[0037] The polymer constituent of this invention is thermally stable again. The polymer constituent is stable under the operating condition of a printer.

[0038] The outer-flame structure 60 forms the nose field 75 which projects from a corner of the massive field 110 which the straight line opened generally, and the massive field 110. The external plastics frame member 78 is fabricated and forms the straight tubing 93 with which internal opening or a slot 94 (henceforth a slot 94) is formed in inside. The slot 94 of straight tubing is connected with the TIJ print head 76 currently fixed by crossing the outer edge of a slot 94. Ink flows through the slot 94 of straight tubing, and supplies ink to the TIJ print head 76. If the globule of ink is extruded outside through a print head nozzle, ink will flow from the ink reservoir 62 through the straight tubing 93 via the fluid path generally shown by arrow heads 97 and 99, and will supply available ink supply to the TIJ print head 76.

[0039] The internal plastics frame member 68 was equipped with the support rib 120 which crosses the throat of the nose field 75 further and projects, and has separated the nose field from the main ink reservoir area 62. Rectangular ***** 122 is generally formed of the envelopment structure of the internal plastics frame member 68 which projects between the support rib 120 and internal opening of the slot 94 of straight tubing.

[0040] The 1st and 2nd ink reservoir film 64 and 66 is attached in the internal plastics frame member 68 according to a heat caulking, adhesives, or other joint processes, and forms leakage-proof closure between the internal plastics frame member 68, 1st, and 2nd ink reservoir film 64 and 66. The 1st and 2nd ink reservoir film 64 and 66 is made from the plastics of the ingredient which is impermeability and manufactures the internal plastics frame member 68 to the ink which it is going to store in the interior of the ink reservoir 62, and the suiting ingredient. The suitable ingredient for the 1st and 2nd ink reservoir film 64 and 66 is ethylene-vinyl acetate (EVA). The ink distribution system has separated the 1st and 2nd ink reservoir film 64 and 66 for the spring 74 which supplies separating power to two opposite piston plates 72A and 72B in preparation for the inside of the ink reservoir 62. A spring and a piston element maintain the pressure concerning the ink in an ink reservoir to negative, and he is trying for ink not to overflow from the TIJ print head 76. The atmospheric pressure concerning the 1st and 2nd ink reservoir film 64 and 66 produces compression of a spring, and draws the piston plates 72A and 72B to the more nearly mutual one as ink is consumed from an ink reservoir.

[0041] The 1st and 2nd ink reservoir film 64 and 66 has spread over the straight tubing field, and in this example, the heat caulking of it is carried out along the marginal fields 68A, 68B, and 68C (drawing 5), and it is maintaining closure of the film which meets around the nose field 75. The 1st and 2nd ink reservoir film 64 and 66 is not closed to the field of the support rib 120. The separators 69A and 69B which constitute the internal plastics frame member 68 separate the 1st and 2nd ink reservoir film from the area of the support rib 120, and hold it, and it is made for the 1st and 2nd ink reservoir film not to curtain toward support rib structure, and, thereby, they have shut the flow of the ink from the ink reservoir to the straight tubing 93.

[0042] An air check valve is prepared in the passage between the TIJ print head 76 and the ink reservoir 62, and he is trying for air bubbles not to advance into the ink reservoir 62 from the TIJ print head 76. This air check valve also performs the function of the filter a particle contamination flows from the ink reservoir 62 to the TIJ print head 76, and it is made for the nozzle of a TIJ print head not to block. In this example, the air check valve equips the both sides of the internal plastics frame member 68 with every two one valve portion material 90 and 92. The valve portion material 90 and 92 is respectively constituted by this model example from some networks of the stainless steel woven by the precision, and that edge is attached in the internal plastics frame member. The network is equipped with the path dimension of 15 microns

of nominal ratings between lines from the adjoining network, and the typical thickness of the network which accomplishes valve portion material is less than 0.005 inches. In this example, each valve portion material 90 and 92 is a square, and has covered abbreviation 1cmx1cm area. It is suitable for the network marketed by the basis of a brand name "RIGIMESH-J" (RIGIMESHU-Jay) from in guru tool [of Oregon Eugene (Eugene)] - and - die (Engle Tool and Die) functioning a check valve. While ink can pass through the path of a network, the magnitude of the path of a network is small enough so that it may not pass through the path of a network where the air bubbles under atmospheric pressure are usually damp in ink. Although the pressure of air bubbles required for making air bubbles pass a network is about 30 inches of water columns in this example, as for this, it is higher than the pressure which the pen cartridge 50 receives under each condition of typical storage, handling, and actuation enough. Consequently, a network functions the air check valve to this pen cartridge 50.

[0043] The 2nd function realized by valve portion material with a network is a function of a particle filter, and it is made for a no less than 15 microns small particle not to pass a network. It is known to use the network of the magnitude of this mesh opening for the particle filter of the ink reservoir containing a bubble of an aeration mold. There is no need for an air check valve in such an ink reservoir.

[0044] The valve portion material 90 and 92 with a network is crossed, and pressure drawdown exists. If the magnitude of network opening is too small, the ink which flows through a network will become inadequate and a TIJ print head will become empty tufted voice. Two valve portion material 90 and 92 is adopted so that sufficient ink may flow into a slot 94 certainly from the ink reservoir 62.

[0045] Drawing 4 and drawing 5 show the nose field 75 of the TIJ pen cartridge 50. Drawing 4 is the sectional view taken along with the line 4-4 of drawing 3 . Drawing 5 is drawing of the nose field which does not have covering and the valve portion material 90 and 92 in a predetermined location. The external plastics frame member 78 is equipped with the tabs 78A and 78B which oppose the sense in one pair, and this performs support for the part of the internal plastics frame member 68 fabricated around the inner circumference of the nose field 75. Tabs 78A and 78B serve also as a core form for fabricating the internal plastics frame member 68. The internal plastics frame member 68 forms ***** 122, and the straight-line part of the internal plastics frame member 68 has spread around the circumference of ***** 122. The internal plastics frame member is formed of the marginal fields 68A-68D. As shown in drawing 3 , the width of face of the internal plastics frame member 68 has specified the width of face of ***** 122. The marginal fields 68A-68D follow, and form the aperture to ***** 122 in each covering pair opposite side of the internal plastics frame member 68. Each side face of ***** 122 which spreads at right angles to the flat surface of coverings 70 and 80 is formed by the plastics which constitutes the internal plastics frame member 68.

[0046] Working and air bubbles may be accumulated into ***** 122. The printer which is installing the TIJ pen cartridge 50 can be equipped with the priming station for adding a vacuum to a TIJ print head, pulling out air bubbles through a TIJ print head, pulling out ink from an ink reservoir, and filling the slot and ***** 122 of straight tubing. Such a priming station is known at this contractor.

[0047] The internal plastics frame member 68 is fabricated so that the thin lip 124 which projects from the marginal fields 68A-68D, and spreads around the circumference of the internal plastics frame member 68 may be formed. Such a lip 124 is formed in each covering pair opposite side of

the internal plastics frame member 68. Only a lip 124 can be seen by drawing 5. During the heat caulking actuation performed to attach the valve portion material by the network screen, the heated mold member is installed in the valve portion material upper part, and is pushed downward by the force toward valve portion material. The temperature of a mold member flows the plastic material which forms a lip 124 into the adjoining clearance between softening or the network with which some of melting plastics accomplishes valve portion material since it is enough to carry out melting. If a mold member is removed and plastics is cooled, valve portion material will be firmly attached in the internal plastics frame member 68 around all the circumferences of the aperture to ***** 122.

[0048] Drawing 6 - drawing 9 show the location and structure of the ink restoration port 130 of the TIJ pen cartridge 50. As shown in drawing 6, in this example, the ink restoration port 130 is established in even flat-surface 60A of the outer-flame structure 60 which adjoins the nose field 75 of a TIJ pen cartridge. Ink is put in an ink reservoir via the ink restoration port 130, and the ink restoration port 130 is closed by inserting the stainless steel ball 132 after that.

[0049] Although the external plastics frame member 78 is fabricated so that opening of a circular cross section may be formed, the diameter of the opening is changing rapidly to the diameter of the larger one of the field 136 which adjoins flat-surface 60A from the diameter of the smaller one of the field 134 where the stainless steel ball 132 is supported. In this example, the diameter of the stainless steel ball 132 is 0.187 inches (4.76mm), the diameter of the smaller one in the field 134 of the external plastics frame member 78 is 0.236 inches (6.0mm), and the diameter of the larger one in the field 136 of the external plastics frame member 78 is 0.283 inches (7.2mm).

[0050] During the period which fabricates the internal plastics frame member 68 in the external plastics frame member 78 manufactured beforehand, melting plastics passes along opening formed in the external plastics frame member 78 as an ink restoration port, and forms the restoration port structure which consists of an internal plastics frame member 68 which is not flowing the surroundings of the shaping pin inserted there. Thus, melting plastics flows the surroundings of the ingredient which forms the external plastics frame member 78 in a field 134, and forms back **** on it. The internal plastics frame member 68 moreover formed in this way forms the ink restoration port 130 connecting with the ink reservoir 62. The diameter of the ink restoration port 130 is making the taper from the 1st diameter of opening which adjoins a front face to the 2nd [of 138 which adjoins the small ink reservoir 62 on parenchyma from the diameter of the stainless steel ball 132] small diameter. In this model example, the 1st diameter is 0.179 inches and the 2nd diameter is 0.120 inches.

[0051] In order to put ink in the ink reservoir 62, it is made a vertical position and a TIJ pen cartridge holds the nose field 75, as shown in drawing 6. An ink restoration needle gets down into an ink reservoir through the ink restoration port 130, and it almost comes to contact the bottom of an ink reservoir. ink is possible for this -- it is carried out so that minimum distance drop may be carried out. That is because some ink will foam and Ushiro's priming will become difficult by that cause, if ink falls. Next, ink is packed to the point that suck up to an ink reservoir of a TIJ pen cartridge, and the ink in an ink reservoir almost contacts inside an ink restoration port through an ink restoration needle with a means. An ink restoration needle is pulled out from a pen at this point, and the stainless steel ball 132 is placed on ink restoration opening. Since a stainless steel ball must carry out the variation rate of some of plastic material which encloses the ink restoration port 130, it fits in firmly into opening 138 for the magnitude to an ink restoration port. The stainless steel ball 130 is stuffed into the ink restoration port 130 next by pushing so

that a tool may contact a bore exactly by the opening 138 of the bottom of ink restoration HOTO 130 in a tool 140 (drawing 9). Although close requires ink for an ink reservoir of a TIJ pen cartridge at this point, the air path which passes along a print head nozzle from on the free surface of ink exists, and this must be removed in order to secure the back pressure of the beginning of a TIJ pen cartridge.

[0052] In the TIJ pen cartridge 50, air is sampled from a TIJ pen cartridge in the condition of 30 degrees of having leaned the degree of angle so that the peak may be the nose field 75. Since air floats to the peak which is a nose field then and becomes easy to sample air by the etching primer from a TIJ pen cartridge by that cause, this is performed. Next, a suction head is installed in the nozzle field upper part of a TIJ pen cartridge, and carries out vacuum suction. The level of ink goes up, a filter with the network which accomplishes valve portion material is wet thoroughly, and, finally the track progresses to its whole to a print head nozzle as a vacuum removes air. The ink of a known amount was lengthened through the nozzle and this process has characterized it as securing the initial back pressure of a TIJ pen cartridge to -1 inch of a water column. Since the discharge preparations of the TIJ pen cartridge are made, the top face of a print head is washed using beautiful water and an air knife, and the surplus ink from a priming process is removed. Any sense can be rotated after the TIJ pen cartridge has held ink in a TIJ pen cartridge, of course, since it finished making the discharge preparations of the TIJ pen cartridge.

[0053] Drawing 10 and drawing 11 isolate for it and show the external plastics frame member 78 which constitutes the TIJ pen cartridge 50. Although the external plastics frame member 78 has presented the external flat side 142 by drawing 11 especially, it turns out that the medial surface of the external plastics frame member 78 presents some stairways which increase the thickness of the external plastics frame member 78, and the plateau 146 is formed. The rib form 144 was formed along the core of the external plastics frame member 78 which projects from a plateau 146, and is equipped with the undercut side faces 144A and 144B. the rib form 144 is shown in drawing 10 -- as -- a part of side face of the external plastics frame member 78 -- or all were boiled for almost, and it has met and spread.

[0054] Although drawing 12 is a side elevation corresponding to drawing 10 , the internal plastics frame member 68 fabricated on the external plastics frame member 78 is shown. The external plastics frame member 78 has covered breadth and the rib form 144 along the plateau 146. The undercut side of a rib form serves as a locking means to lock the internal plastics frame member 68 in the internal plastics frame member 68. In this example, the thickness of the internal plastics frame member 68 is T (0.059 inches), and the width of face in the area shown in drawing 13 is W (0.354 inches). The side faces 148 and 150 of the internal plastics frame member 68 generally prolonged at right angles to the external plastics frame member 78 are the front faces in which the 1st and 2nd ink reservoir film 64 and 66 can be attached.

[0055] The ingredient which forms the internal plastics frame member 68 is equipped with contraction when cooling from a melting condition. This ingredient is fabricated inside the external plastics frame member 78, and it tends to contract so that it may separate from the external plastics frame member 78, as it cools. In order to keep the internal plastics frame member 68 attached to the external plastics frame member 78, an internal plastics frame member is fabricated on the rib form 144 of the undercut currently fabricated as a part of external plastics frame member 78. It is locked by these rib form 144 on the external plastics frame member 78, and reverse is pulled apart from the external plastics frame member 78 by the force of the ingredient which forms the internal plastics frame member 68 by that cause by contraction of the

ingredient as the ingredient which forms the internal plastics frame member 68 cools. The rib form 144 for the lock of a graphic display is equipped with the simple cross section which is easy to fabricate.

[0056] soft polyolefine -- a mixture can be used as an ingredient of the internal plastics frame member 68. it -- this polyolefine -- a mixture -- NORYL It is because pasted up chemically on the surface of the ingredient, and it has very low (almost equal [inch] in 2.5 mils /of NORYL) contraction, so the force produced in a contraction process is lower than the pure polyethylene which is about 20 mils/inch.

[0057] Drawing 14 and drawing 15 show the structure of the internal plastics frame member 68 in a nose field, and the external plastics frame 78 further to a detail. The ingredient of the internal plastics frame member 68 flows TabA [78] and 78B top, and bonnet and rib 93A locks the straight tubing 93.

[0058] Drawing 16 is the sectional view taken along with the line 16-16 of drawing 6 . The element which forms an ink reservoir can be seen here. anchoring of the 1st which is spring **** to the pair opposite side sides 148 and 150 of the internal plastics frame member 68, and the 2nd person ink reservoir film 64 and 66 is shown. Especially drawing 17 is the enlarged drawing showing heat caulking anchoring to the side face 148 of the internal plastics frame member 68 of the 2nd ink reservoir film 66. It is common knowledge in the plastics industry in itself [heat caulking].

[0059] Drawing 18 and drawing 19 show two examples alternative to being the lock form which can form instead of [of the rib form 144] in the inner surface of the external plastics frame member 78. Therefore, drawing 18 shows external plastics frame member 78a which has adopted the small handle-like form on the parenchyma which has the opening 160 into which melting plastics flows, when fabricating lock form 144a, i.e., internal plastics frame member 68a.

Drawing 19 shows external plastics frame member 78a equipped with lock form 144a in which the round undercut opening 162 is formed. Melting plastics flows into the undercut opening 162, when fabricating internal plastics frame member 68a.

[0060] The approach of fabricating the internal plastics frame member 68 to the external plastics frame member 78 is described at the quoted United States patent application number 07th / No. 853,372. If it states to whether it is short, denaturation polyphenylene oxide 78, i.e., the external plastics frame member of the 1st molding material, will be manufactured with plastics injection molding. This external plastics frame member 78 is called "1st shot." The 1st shot is poured into the 2nd mold next, and the 2nd molding material is fabricated on it here. if this the "2nd shot" is cooled -- being certain -- extent contraction is carried out.

[0061] I hear that the internal plastics frame member 68 can be made from the ingredient (polyolefine -- it is like a mixture) softer than the engineering plastic of the external plastics frame member 78 with ductility which works also as attenuation material partly, and there is the advantage of two ingredients which constitute the frame of the TIJ pen cartridge 50 about it, when this pen cartridge 50 is dropped. This tends to prevent a crack, the tear of the film, and the breakages on other. Moreover, although the ingredient with the soft ductility of the internal plastics frame member 68 resembles rubber from the engineering plastic, it cannot produce stress cracking easily. If the ingredient of a polyethylene system like polyolefine is used for manufacturing the internal plastics frame member 68, there will be still more nearly another profit that moisture permeability is low, and chemical compatibility with the chemicals which constitute the ink which reverse maintains the contents of the ink in an ink reservoir to leakage or

evaporation, and uses them for a TIJ pen cartridge by that cause will be maintained. The valve portion material 90 and 92 as a filter can be easily attached in such an ingredient to the internal plastics frame member 68 in contrast with an engineering plastic. Because, the ingredient of a polyolefine system has low heat caulking temperature, it is easy to carry out ** ON of the ingredient to the network of a filter, and, thereby, positive junction is performed between the internal plastics frame member 68, and the air check valve / valve portion material 90 and 92. [0062] It is necessary to make the area of the TIJ print head 76 and a filter element, i.e., the TIJ pen cartridge between the valve portion material 90 and 92, there be no particle contamination of sufficient magnitude to block the nozzle of a print head at the time of shaping of the internal plastics frame member 68 and the internal plastics frame member 78. The core pin which form a straight tubing room in the case of the insert molding of a TIJ pen cartridge which be being describe at the United States patent application number 07th under quoted connection / No. 853,872 need to engage with the ingredient of the 1st shot which form the external plastics frame member 78 , and need to make sufficiently tight the fuse ingredient of the 2nd shot which be about closure under the pressure which form the internal plastics frame member 68 making it not enter . Since engagement of the core pin inside the straight tubing 93 may produce the particle from which an operation of engagement wears down the wall of the ingredient of the 1st shot, remains behind, and produces the manifestation of contamination, it is a pollution source. Cutoff of a core pin and the area of wiping are the minimum by the design of the core pin 170 shown in drawing 20 . In this design, the ingredient of the 2nd shot which forms the internal plastics frame member 68 is made to back-**** the inside of the slot 94 of straight tubing selectively, wipes it off, and lessens the operation. Both drawing 20 shows two half-molds 174 and 176 which bring on the external plastics frame member 78, and form the cavity of the mold for the 2nd-shot shaping of an internal plastics frame member in the nose field 75. The slot pin 172 crossed the half-mold and has fitted in. The core pin 170 as a mold cavernous pin was inserted in Mizouchi of straight tubing, and has received the head into the crevice formed in the slot pin 172. The core pin 170 is a taper and forms space in a circle above shoulder 170A between a core pin and the slot of straight tubing formed in the external plastics frame member 78. A core pin 170 fits into Mizouchi of straight tubing under shoulder 170A firmly, and forms plug area 170B by which it is made for the ingredient of the 2nd shot not to flow into plug field 170B of an area during shaping. The 2nd shot ingredient can flow into space in a circle by this pin configuration, and wrap back **** can be caudad formed for the interior of straight tubing to plug field 170B. The front faces 79A and 79B of the external plastics frame member 78 serve also as a cutoff side where the front face of a half-mold contacts, and it is made for the 2nd shot ingredient not to flow through junction between front faces 79A and 79B and a half-mold.

[0063] Other approaches of making the problem of contamination as small as possible are automating the charge to the mold of the 2nd shot opportunity of the external plastics frame member 78 of the 1st shot. Although this automation uses a robot charging machine, this is a customary thing in the shaping industry which installs an external plastics frame member in the mold of the 2nd shot in advance of shaping. A robot can be used for being able to insert an external plastics frame member in a robot charging machine by the automatic feeder system by hand, or selecting an external plastics frame member out of the 1st shot making machine, and installing them in the 2nd making machine. The much more good accommodation environment which is useful to all of these activities of automation cleaning components is considered.

[0064] One making machine can be equipped with a means to fabricate the 1st ingredient, and

can move the just [of it] fabricated shot to the predetermined location to the barrel of the 2nd ingredient, and these two ingredients, i.e., an external plastics frame member, and an internal plastics frame member can also make it by the two-shot fabricating method which subsequently fabricates the 2nd ingredient and completes components. Such a two-shot shaping process is known in this industry.

[0065] In above-mentioned shaping, point ***** of the engineering plastic of an ingredient and the external plastics frame member 78 which has the melting temperature of the higher one is carried out by the 1st shot, and the external plastics frame member 78 is formed. the ingredient which has the melting temperature of the lower one, and polyolefine -- it assists forming the cavity of the mold of the 2nd shot using the external plastics frame member already fabricated in the mixture or the polyethylene system ingredient, and the internal plastics frame member 68 is formed in a degree. Instead, this shaping process can be made into reverse and melting temperature can fabricate the ingredient of the higher one in an insert molding process on an ingredient with lower melting temperature. The interlocking form between the internal plastics frame member 68 and the external plastics frame member 78 is formed on the 1st shot 68, i.e., an internal plastics frame member, using sufficient undercut to lock both two ingredients. It is necessary to stop the temperature of a mold to the bottom near the melting point of the 1st shot of low temperature. In the case of a certain engineering plastic, it may become still more difficult for this to fabricate them. Moreover, since the plastics of the 2nd shot is fabricated [be / it / under / of a mold / reaching] on the plastics of the 1st shot, the 1st shot is fused along the interface of plastics. A process condition must be washed away, when the 1st shot's maintains the integrity, and it is only influenced along an interface and the 2nd shot's is fabricated on the 1st shot.

[0066] Drawing 21 shows such an insert molding process in the area of straight tubing of the TIJ pen cartridge 50. The internal plastics frame member 68 is first fabricated in the mold of the 1st shot. Next, the front face of the internal plastics frame member 68 is used for forming some of mold front faces of the 2nd shot, and the external plastics frame member 78 of an external engineering plastic is fabricated on the internal plastics frame member 68. The core pin 180 and the mold cap 182 form the slot of internal straight tubing, and the top face of a straight tubing area. The outside ring of 184 of an engineering plastic is formed on the internal plastics frame member 68 of the 1st shot plastics, and the compression ring which compresses the low temperature ingredient of the internal plastics frame member 68 is formed on inside straight tubing formed of the 2nd shot. The 1st shot ingredient is compressed toward the 2nd shot by 186 which forms straight tubing for the 1st shot ingredient as the ingredient of the 2nd shot cools.

[0067] Drawing 22 shows the insert molding configuration alternative to receiving straight tubing in the condition of having fabricated the ingredient of the temperature of the lower one first. Since the 2nd shot does not form a compression ring in the surroundings of the low temperature ingredient which encloses straight tubing here, the 2nd shot ingredient fuses an interface and association between two ingredients only depends it on chemical association between 2 ingredients supported when helping to produce association better than the case where a low temperature ingredient is fabricated at the end. In this case, it is cooled as a mold is buried, and since the directions of the temperature of the 2nd shot ingredient are a high thing and its heat capacity, the 2nd shot is not so hot as it is possible in this case in all the areas in alignment with junction. However, the configuration of drawing 21 is superior to the thing of drawing 22 . It is because closure of both that the former configuration is chemical and a machine target is

produced.

[0068] There are some advantages in such an insert molding process of the high temperature ingredient on low temperature plastic material. The main profits are in the area of straight tubing. The core pin 180 which fabricates straight tubing opening to a TIJ print head in shaping of the engineering plastic material of the 2nd shot does not have the problem of above-mentioned wear that what is necessary is just to retreat from two shot of ** after shaping therefore. In this case, although the mold cap 182 must retreat and this may produce wear, since the hole where it retreats is formed of the completely same core pin, fitting between a core pin and straight tubing is dramatically exact, and wear becomes less than the case where an engineering plastic is the 1st shot ingredient. In that case, a core pin is discharged from the mold of the 1st shot, subsequently the external plastics frame member 78 is discharged from a mold, it contracts, an external plastics frame member is processed, and the distortion of straight tubing is produced. At the end, another straight tubing core pin is prepared, and it pushes into the slot of straight tubing of the external plastics frame member 78. In the current case which carries out insert molding of the ingredient with lower temperature first, the ingredient of the 1st shot does not contact a core pin 180. Although it contracts on the internal 1st shot ingredient and produces junction just as the engineering plastic of the 2nd shot cools, I hear that other advantages of this approach tend to be pulled apart from the 1st shot inside the boundary of the junction with two shots far from straight tubing in law of the 2nd-shot natural contraction which forms an engineering plastic first, and there are.

[0069] Other shaping processes which can be used for manufacturing the internal plastics frame member 68 and the external plastics frame member 78 are 2 shaping processes which fabricate engineering plastic material with higher temperature on polyolefine with lower temperature. If an ingredient with lower temperature is fabricated inside an ingredient with higher temperature, the part of the 1st shot must be contracted and separated from there, and it must carry inside a core with the inclination which becomes loose as described at the United States patent application number 07th / No. 853,372. In this new two-shot shaping process, it fabricates on the core which contracts the 1st shot firmly on it, subsequently to the 1st shot top, the 2nd shot is fabricated in it, and the 2nd shot is also strongly contracted on the 1st shot in it.

[0070] Drawing 23 shows the example instead of the nose field of a TIJ pen cartridge in the form before fabricating the internal plastics frame member 68 on the internal plastics frame member 68 of an engineering plastic. By nose field 75c, external plastics frame member 78c forms fluid straight tubing 93c to which the interior in which **** 94c which is internal opening prolonged to opening formed in the outside surface of external plastics frame member 78c through straight tubing is formed stood straight. it comes out through this slot that ink flows from an ink reservoir to the TIJ print head which will be installed in a nose field.

[0071] Drawing 23 shows the open field 202 which encloses straight tubing 93c of the fluid which projects upward inside external plastics frame member 78c. One pair of rib 93Ac(s) detached and prepared and 93Bc(s) project from the lateral surface of the straight tubing 93. A stanchion 204 crosses the throat of nose field 75c, and is formed.

[0072] If drawing 24 is referred to shortly, external plastics frame member 78c is illustrated in the condition that internal plastics frame member 68c is fabricated by the inner surface of external plastics frame member 78c. The ingredient which forms an internal plastics frame member is fabricated around straight tubing 93c, without covering slot 94c, and the front face on which the ink reservoir film which is spring bag film film can be closed is offered.

[0073] It is understood that an above-mentioned example is mere instantiation of the possible specific example which can express the principle of this invention. This contractor can guess other configurations easily according to those principles, without deviating from the range and pneuma of this invention.

[0074] Although each example of this invention was explained in full detail above, in order to make an understanding of each example of this invention easy here, it summarizes for every example and enumerates below.

[0075] 1. In Ink Cartridge for Printers Equipped with Ink Reservoir The frame structure object which consists of the outer-flame member manufactured from the 1st **** plastic material, and the inner flame member manufactured from the 2nd plastic material, It is formed from the 3rd plastic material and joined to said inner flame member. With said frame structure object the 1st which forms said ink reservoir, and the 2nd impermeable film -- since -- it is constituted and said 2nd plastic material is an ink cartridge which suits said 3rd plastic material and is enabling leakage-proof junction over said inner flame member of said impermeable film.

[0076] 2. Said 2nd plastic material consists of polymer mixing constituents which consist of at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group who consists of the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene, and (A) and (B) are ink cartridges given in said 1 which is a different thing.

[0077] 3. (A) given in said 2 is low density polyethylene.

[0078] 4. (A) given in said 2 is the copolymer of ethylene and the alpha-olefin which has the carbon atoms from about 4 to about 18.

[0079] 5. (B) given in said 2 is the random copolymer of a propylene and ethylene.

[0080] 6. The melt flow index of (B) given in said 2 is about 3 to about 45.

[0081] 7. (A) given in said 2 exists in the amount from about 60 % of the weight to about 90 % of the weight, (B) given in said 2 exists in the amount from about 10 % of the weight to about 40 % of the weight, and the weight percent in this case is based on what mixed (B) with (A) for it.

[0082] 8. Furthermore, the (C) bulking agent can be included in a polymer mixing constituent given in said 2.

[0083] 9. Furthermore, the (d) stabilizer can be included in a polymer mixing constituent given in said 2.

[0084] 10. at least one of a copolymer with the alpha-olefin in which the 2nd plastic material given in said 1 has (A) ethylene and the carbon atoms from about 4 to about 18, and the random copolymers of the (B) propylene and ethylene -- since -- it is the ink cartridge which consists of polymer mixing constituents which change.

[0085] 11. From about 65 % of the Weight to about 85% of the Weight of at Least One Polymer Chosen from Group to whom 2nd Plastic Material of Publication Changes from Copolymer of (A) Low Density Polyethylene and Ethylene, and Alpha-Olefin to Said 1 From about 15 % of the weight to and about 35% of the weight of at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene since -- it consists of constituted polymer mixing constituents, and the melt index of a polymer is about 5 to about 15 in this case, and (A) is an ink cartridge whose (B) is a different thing.

[0086] 12. It is the Approach of Forming Leakage-proof Junction between 1st [for Ink Cartridge Pens of Printer], and 2nd Ingredient Which Can be Fabricated. The process fabricated in the 1st predetermined structure equipped with the cavity which forms the periphery of internal straight

tube part material for said 1st ingredient, The process which pours in the ingredient which installs said 1st structure into a mold and said 2nd [the] can fabricate, It is the process which pours into said mold the ingredient which said 2nd [the] in a melting condition can fabricate. In this case, the process which said 2nd ingredient buries the periphery of said cavity, fabricates it to said 1st structure, and forms the periphery of said straight tube part material, Said ingredient which the 2nd can fabricate was made to cool, and it has accomplished according to the process which forms leakage-proof closure by that cause between said 1st surrounding ingredient and 2nd surrounding ingredient of said straight tube part material.

[0087] 13. At Least One Polymer Chosen from Group to whom Said Ingredient Which the 2nd Can Fabricate Changes from Copolymer of (A) Polyethylene and Ethylene, and Alpha-Olefin, and at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene -- since -- it consists of constituted polymer mixing constituents, and is an approach given in said 12 which is that from which (A) and (B) differ in this case.

[0088] 14. Outer-Flame Structural Member Made from 1st **** Plastic Material, And it is the approach of manufacturing the ink cartridge of the printer which consists of frame structure objects which consist of the inner flame member made from the plastic material of back ***** 2 in said a part of external member. In the approach characterized by said 1st ingredient having fixed contraction at the time of cooling of this ingredient The process which injection molds said 2nd ingredient in said internal back **** member, and said internal back **** member are installed into a mold. It is the process which injection molds said outer-flame member around said internal member. The process in which the front face of said internal member forms a part of mold cavity which will pour in said 1st ingredient, The process which pours in said 1st ingredient in a melting condition into said mold cavity currently formed of said mold and said internal member, the process make cool said 1st ingredient, contracts said 1st ingredient around said internal member, and make it said whose external member suit to the surroundings of said internal member just -- since -- it is the approach constituted.

[0089] 15. at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group to whom said 2nd plastic material changes from the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene -- since -- it consists of polymer mixing constituents constituted, and it is an approach given in said 14 which is that from which (A), and (B) differ in this case.

[0090]

[Effect of the Invention] As mentioned above, according to this invention, the outer-flame member by the 1st **** plastic material and the inner flame member by the 2nd plastic material constitute a frame structure object. Join the impermeable film by the 3rd plastic material to an inner flame member, and an ink reservoir is formed with a frame structure object. Since it constituted so that the 2nd plastic material of an inner flame member might suit with the 3rd plastic material and leakage-proof junction might be performed to an inner flame member About the impermeable film, heat and a pressure can be applied to an inner flame member, closure can become possible, chemical and the crack by the stress resulting from heat or a pressure can be prevented, and leakage of ink can be prevented certainly.

TECHNICAL FIELD

[Industrial Application] About the ink reservoir for heat ink jet (henceforth TIJ) print cartridges, this invention relates to the ink cartridge formed in the application of an ink jet printer with the useful polymer mixing constituent, if it states to a detail further.

PRIOR ART

[Description of the Prior Art] The TIJ technique is widely used for the printer for computers. Very generally, TIJ is equipped with the print head which consists of the ink jet in which some very small accommodation is typically possible, and in order to make some of images or images, this operates selectively and emits injection or the fuel spray of ink on print media (it is (like paper)) from ink **. The TIJ printer is described in the Hewlett Packard journal and Maki 36, number May, 1985 [5 or] and, Maki 39, and number August, 1988 [4 or] (Hewlet-Packard Journal Vol.36, No.5, May1985 and Vol.39, No.4, and Aug1988).

EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, the outer-flame member by the 1st **** plastic material and the inner flame member by the 2nd plastic material constituted the frame structure object, the impermeable film by the 3rd plastic material was joined to the inner flame member, and the ink reservoir was formed with the frame structure object, and it constituted from this invention so that the 2nd plastic material of an inner flame member might suit with the 3rd plastic material and leakage-proof junction might be performed to an inner flame member. Therefore, about the impermeable film, heat and a pressure can be applied to an inner flame member, closure can become possible, chemical and the crack by the stress resulting from heat or a pressure can be prevented, and leakage of ink can be prevented certainly.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The plastic part used for a printer must show various properties. Especially the polymer mixture used in case a plastic part is made must suit other polymers used in case other components which constitute a printer are made, and must suit the ink used for a printer. When using polymer mixture for a printer cartridge, a polymer is exposed to the ink which has the various ingredients which attack a polymer chemically. When a polymer can weaken in ink, leakage of ink and the dirt of a printing image may be produced by stress cracking.

[0004] Other problems about the polymer mixture used for an ink cartridge are compatibility with other polymers used for manufacturing ink cartridge itself. The polymer is usually closed so that it may be formed in the shape of a film and an ink cartridge may be formed. The polymer mixing constituent is equipped with the adhesiveness which was excellent to other polymer component parts of an ink cartridge besides the film structure.

[0005] Therefore, it is desirable to prepare the polymer mixing constituent which bears a chemical attack and stress cracking. Furthermore, it is desirable to prepare the polymer mixing constituent which suits the polymer structure of an ink cartridge.

MEANS

[Means for Solving the Problem] According to one aspect of affairs of this invention, the printer ink cartridge equipped with the ink reservoir is equipped with the frame structure object which consists of an outer-flame member manufactured from the 1st **** plastic material, and an inner flame member manufactured from the 2nd plastic material with which a property differs from the 1st plastic material in that there is ductility still more softly and further. It is joined to an inner flame member and the 1st and 2nd impermeable film formed from the 3rd ingredient forms the ink reservoir with the member. The 2nd plastic material suits with the 3rd plastic material, and is enabling leakage-proof junction over the inner flame member of the impermeable film. Since the 2nd plastic material and said 3rd plastic material conform suitably, said impermeable film can be closed by applying heat and a pressure to said inner flame member.

[0007] According to other aspects of affairs of this invention, an external plastics frame frame member is equipped with the inner surface which attaches an internal plastics frame member, and two or more forms for a lock are formed in this inner surface. An internal plastics frame member is formed by carrying out injection molding of the 2nd plastic material in a melting condition, and the 2nd plastic material is characterized by having fixed contraction at the time of the cooling. A melting ingredient flows the surroundings of the form for a lock of an external plastics frame member among injection molding. When a melting ingredient cools, an internal plastics frame member is locked by the external plastics frame member with the form for a lock.

[0008] The form for a lock is equipped with the projection rib which projects suitably from the front face of the external member formed of an undercut side, and the 2nd fused plastic material flows the surroundings of a projection rib toward an undercut side among injection molding.

[0009] According to other aspects of affairs of this invention, the pen is equipped with a means to close the ink restoration port which pierces through the internal member connecting with an external plastics frame member and an ink reservoir further, and extends, and said path. Suitably, the path is back-****(ed) by the 2nd ingredient and a closure means is a ball with a slightly larger cross section than the diameter of a path. This ball is pressed fit in a path and is closing the path.

[0010] At least one polymer which was chosen from the group to whom the internal plastics frame member of this invention changes from the copolymer of (A) polyethylene and ethylene, and an alpha-olefin according to the aspect of affairs of further others of this invention, and at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene -- since -- it is manufactured from the polymer mixing constituent constituted, and (A) differs from (B) in this case.

[0011] The polymer constituent of this invention shows chemical stability with the good time of being exposed to ink. Furthermore, the property is semicrystallinity, the polymer constituent of this invention is supple and its compatibility with other polymers is good.

EXAMPLE

[Example] Drawing 1 - drawing 17 show the TIJ pen cartridge 50 which materializes this invention. The heat ink jet pen cartridge 50 is equipped with the outer-flame structure 60 which forms the closed band which forms the circumference of the heat ink jet pen cartridge 50, or a loop formation. The outer-flame structure 60 consists of internal plastics frame members 68 as the external plastics frame member 78 and inner flame member as two chemically different outer-flame members. the external plastics frame member 78 is like denaturation polyphenylene oxide containing glass like the ingredient marketed with the trademark "NORYL" (noryl), from General Electric (General Electric Company) -- it is comparatively fabricated from a **** engineering plastic. The inner circumference of the external plastics frame member 78 injection molds the internal plastics frame member 68, and it is manufactured from the plastic material suitable for attaching in the 1st and 2nd ink reservoir film 64 and 66.

[0013] at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group to whom the plastics suitable for the internal plastics frame member 68 changes from the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene -- since -- it is the polymer mixing constituent constituted and is made for (A) to differ from (B) in this case

[0014] Furthermore, the polymer constituent is equipped with a certain polymer chosen from the group who consists of the copolymer of (A) polyethylene and ethylene, and an alpha-olefin if it states to a detail. (A) is a copolymer and it is made for (A) to differ from (B). Generally, (A) exists in the amount to about 60% of the weight of the mixture of (A) and (B), about 65 % of the weight - about 90 % of the weight, or about 85 % of the weight. Typically, the melt flow index of (A) is to about 3 or about 5 - abbreviation 20, about 14, or about 10.

[0015] In the one example, (A) is a low consistency polymer. general -- the consistency of (A) -- about 0.92 g/cm³ it is . Generally, the consistency of (A) is to about 0.80, about 0.85 or 0.88 - abbreviation 0.92, about 0.91, or about 0.90. Generally, the weight average molecular weight Mw of (A) is to about 30,000, about 50,000 or about 75,000 - abbreviation 500,000, about 300,000, or about 200,000. In other examples, the Mw/Mn ratio of (A) is to about 1.5, about 1.7 or about 1.8 - abbreviation 8, or about 5, about 4 or about 3. Here, Mn points out number average molecular weight. Generally, it discovered that especially the polymer with which this invention people have narrow polydispersity (for example, a Mw/Mn ratio is less than five) was effective.

[0016] In the one example, a polymer (A) is polyethylene, is low density polyethylene suitably, and is a super-low consistency still more suitably. general -- the consistency of super-low density polyethylene -- a maximum of -- about 0.910 g/cm³ it is . To this contractor, polyethylene is known and available from a commercial scene. as the example of polyethylene -- C dee EFUKEMI (CDF Chemie) from -- there are the trade name "NOSO flex time EFU W 1900" (Norsoflex FW1900) (consistency about 0.900 g/cm³) marketed and trade name "ATEIN" (Attane) 4001 which are marketed from the Dow Chemical and the company of Michigan Midland (Dow Chemical Company), and 4002 and 4004.

[0017] In other examples, (A) is the copolymer of ethylene and an alpha-olefin. Generally the alpha-olefin contains about 3 or about 4 - abbreviation 18, or the carbon atom to about 12. There are a no butene, a no hexene, and no octene in the example of a useful alpha-olefin. Generally these copolymers contain the ethylene to about 20 % of the weight, about 30 % of the weight,

about 35 % of the weight - about 90 % of the weight, about 85 % of the weight, or about 80 % of the weight.

[0018] A copolymer can be prepared with a known means to this contractor. A copolymer is made from one example using a metallocene catalyst. Some metallocene catalysts turn into a catalyst. This produces the uniform polymer of side-chain distribution. This produces the polymer of low polydispersity called less than ten. There are a titanium system, a zirconium system, and a transition-metals metallocene catalyst like a chromium system catalyst as metallocene catalyst. Typically, these catalysts are bupleuri radix pen TADI enyl derivatives. A catalyst can be used as the resultant of a metallocene and ARUMOKUSAN in other examples. The process which prepares these copolymers is indicated by U.S. Pat. No. 4,303,771, No. 4,482,687, No. 4,508,842, No. 4,897,455, No. 4,871,705, No. 4,937,299, No. 5,183,867, and No. 5,186,851. It has taken in by reference here about the instruction which aims at the approach of making the copolymer of ethylene and an alpha-olefin, a metallocene catalyst, and these copolymers for these patents.

[0019] There is a polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene again in a polymer constituent. Generally, the melt flow index of (B) is to about 12 or about 20 - abbreviation 45, or about 40. These polymers exist typically in the amount to about 10% of the weight of the mixture of (A) and (B), about 15 % of the weight - about 40 % of the weight, or about 35 % of the weight. the example of a propylene homogeneity polymer -- a trade name -- ""shell Py Py, 5 and A, 9, 7 [ShellPP five A97 (melt flow index (MFI): 4)]", "ray-MOKO Py Py and 7644" [A-moco PP 7644 (MFI:24)], and Genesys A Py, 2, Py Py, 2, 6 and Py" [Genesis AP2PP26P (MFI:12)] have.

[0020] In the one example, (A) is the block copolymer of a propylene and ethylene. In this example, (A) contains the ethylene to about 4 % of the weight, about 8 % of the weight, about 10 % of the weight - about 30 % of the weight, about 25 % of the weight, about 20 % of the weight, or about 15 % of the weight. There is a trade name "the pro facsimile 7823 and 85223" (Profax 7823 and 8523) of "shell Py Py, 5 and C and 12" [Shell PP5C 12 (MFI:17)] and Himont (Himont) in the example of the block copolymer of a propylene and ethylene.

[0021] In other examples, (A) is the random copolymer of a propylene and ethylene. Generally in this example, (A) is contained to about 1% of the weight of ethylene, about 4 % of the weight - about 10 % of the weight, or about 7 % of the weight. In the one example, an ethylene content is about 6 % of the weight. In other examples, an ethylene content is from about 3 % of the weight to about 4 % of the weight.

[0022] To this contractor, a process useful although the propylene ethylene copolymer which is useful to preparing this invention is prepared is common knowledge, and is available in a commercial scene. [of the copolymer of such a large number] Such a random copolymer The various-subjects lexicon of a wheelie, the polymer science of SONZU (Wiley & Sons) issuance, and a technique (Encyclopedia of Polymer Science & Eng-ineering), Maki 13, the 2nd edition (Vol.13, 2nd edition), It can prepare also by which of many known approaches to this contractor containing what is shown after 500 page (and footnote quoted there) (it has taken in by referring to this this time). The propylene ethylene copolymer which is useful to this invention can come to hand from a commercial scene. the example of these copolymers -- the Fina oil and the chemical company (Fina Oil and Chemical Company) of American Texas Dallas from -- Fina Wai -8573 and "ZETT -7650" [Fina [which may receive] Y-8573 (from about 3% to about 4% by the weight of ethylene) The trade name which can contain and come to hand from the

SORUTEKKUSU polymer company (Soltex Polymer Corporation) of Z-7650] United States of America Texas Houston "SORUTEKKUSU 4298" (Soltex4298), ShellChemical () of "the REKUSEN R and 29257" (RexeneR 29257) and American Texas Houston which can come to hand from Rexene (Rexene Corporation) [Shell] There are "shell W Earl Dee 6-281" (Shell WR D 6-281) who can obtain from Chemical Company, and "an S R and 06" [SR06 (MFI is 32)].

[0023] Bulking agent (C)

The above-mentioned polymer constituent can contain one or more bulking agents of the format currently used with the polymer technique. Talc, a calcium carbonate, a mica, wollastonite, dolomite lime, a glass fiber, a boron fiber, a carbon fiber, carbon black, pigments like a titanium dioxide, or those mixture are in the example of the bulking agent currently used for typical compound polymer mixture. a commercial scene [like the trade name "selection-ray-SOBU" (Select-A-Sorb) of R tee Vanderbilt (R. T.Vanderbilt)] whose desirable bulking agent is -- there are available talc, Jet Phil (Jet Fil), and a glass fiber. The amount of the bulking agent contained in a mixed polymer may change from about 1% to about 20% of the mixed weight of a polymer and a bulking agent. Generally the amount from 10% to about 20% is contained.

[0024] A bulking agent can be processed with a binder and can improve association between a bulking agent and resin. For example, a bulking agent can be processed with ingredients, such as a fatty acid (for example, stearin acid), a silane, and maleate processing polypropylene. The amount of the binder to be used is an amount effective in improving association between a bulking agent and resin.

[0025] Polymer mixture is made to contain other additives, and a necessary property can be changed or acquired. For example, polymer mixture can be made to contain a stabilizer, lubricant, a nucleation agent, a plasticizer, a release agent and oxidation, heat, and the inhibitor of degradation by ultraviolet rays.

[0026] A stabilizer (D) may be incorporated to a constituent in any phase on the occasion of preparation of polymer mixture, and it is made incorporate a stabilizer at an early stage, and for degradation not to start suitably, until it can protect a constituent. What is generally used for a polymer is contained in the oxidation and the thermostabilizer which are useful to the polymer mixture of this invention. a metal halogenide [like sodium, a potassium, a lithium, and the halogenide (for example a chloride, a bromide, and an iodide) of one of copper] of the first group of the periodic table whose they are, an interference phenol, a hydroquinone, a phosphite allyl compound, the various permutation derivatives of these ingredients, and those mixture -- a foundation [weight / of polymer mixture] -- carrying out -- a maximum of -- it contains only about 1% of the weight. There is the whole family of the interference phenol marketed from CHIBAGAIGI (Ciba-Geigy) as a brand name "Irganox" (a metaphor is Irganox 1010, Irganox 1076, and Irganox B-225) in the specific example of an interference phenol stabilizer. It is reported that Irganox 1010 is tetrakis [methylene (3, 5-Jeter-butyl-4-hydroxy) hydronium cinae flos mate] methane. Irganox 1076 is n-octadecyl-3-(3, 5-Jeter-butyl-4-hydroxyphenyl) propionate. Irganox B-225 are the mixture of Irganox1010 and Ultranox168 (fragrance phosphite).

[0027] UV stabilizer can be contained in the amount of about 2 % of the weight of the maximum on the basis of the weight of polymer mixture. There are various permutation REZORUSHINORU, salicylate, benzotriazol, a benzophenone, etc. in the example of an ultraviolet radiation stabilizer. The shaping components made from this ingredient can be exposed to ultraviolet radiation selectively or thoroughly to a certain application.

[0028] Suitable lubricant and a suitable release agent can be contained in the amount of about 1 % of the weight of the maximum on the basis of the weight of the polymer mixture containing stearin acid, stearin alcohol, and an ingredient like stearamide.

[0029] The adjustment mixed polymer presentation of polymer mixture can be adjusted to this contractor by the well-known approach. For example, especially a useful procedure is mixing a polymer intimately using a flour mill, Banbury, Brabender, and an independent or traditional melting mixing facility of the screw-thread extruder of 2 reams, a continuous mixer, a kneading (kneading) machine, etc. For example, a polymer is intimately mixable in the form of a fine grain and/or powder within a high shearing mixer. One suitable process of preparing a mixed polymer uses Farel consecutive-processing machine (Farrell Continuous Processor) CP-23, CP-45, and CP-57. The short residence time and high shearing are CP-23, CP-45, and CP-57. It is obtained easily. "Intimate" mixing means being prepared using sufficient mechanical shearing and heat energy producing the dispersed phase which mixture is divided finely and distributed by homogeneity in a continuous phase or a primary phase.

[0030] Various descriptions and aspects of affairs of this invention are further illustrated in the following examples. Although these examples show this contractor how to operate it within the limits of this invention, they do not serve for such range to limit the range of this invention specified only by the claim. Furthermore, in the following examples, the method of preparation of the sheet of mixture, a composite, an injection-molding sample, a monolayer, or a laminating is illustrated. It should not be thought that these examples only carry out the work as an instantiation example of this invention, and limit it.

[0031] Otherwise in the following example, it points, and as long as there is nothing, in anywhere of a description and a claim, the pressure of all of a part and a percentage is atmospheric pressure by whenever [of Centigrade] in weight, or temperature is near it.

[0032] Before preparing the mixed polymer constituent of one to example 4 this invention by mixer rotational-speed 600rpm and making it into a pellet by above-mentioned Farrell Continuous Processor C -23, it extrudes in yarn at about 200 degrees C rather than it has passed the cistern and the air wiper.

[0033]

[A table 1]

[0034] The upper polymer constituent is also mixable with a bulking agent like glass fiber like OCF(s) 144A and 492 which can come to hand from the Owen kerning fiberglass company (Owens Corning Fiber-glass), and 457BA. Useful polymer mixture can be prepared when the polymer constituent of OCF457BA is mixed 10% of the weight in each of the upper example.

[0035] Although the polymer constituent of this invention is used with an ink jet printer, it is useful to preparing a printer cartridge [like]. The polymer constituent conforms to ink and is equal to the attack of chemical and a solvent. Stress-cracking resistance of a polymer constituent is improving. A polymer constituent shows a processing property good again, and has good molding possibility and a good fluidity.

[0036] These polymers constituent is equipped with the advantageous adhesive property to the polymer and polymer mixture which are typically used for a printer. The polymer constituent of this invention shows the unexpected good adhesive property to both of the polymer alloy of polyethylene, and the phenylene ether and polystyrene. For example, the mixture which consists of the polystyrene and polyphenylene ether which contain typically from a polystyrene unit [about 25% of the weight of] to about 50 % of the weight can come to hand as thermoplastics of a brand name "NORYL TM" (noil) from a general electric company (General Electric Company) in a commercial scene. The molecular weight of such mixture is in the range from about 10,000 to about 50,000, and, in further many cases, it is about 30,000.

[0037] The polymer constituent of this invention is thermally stable again. The polymer constituent is stable under the operating condition of a printer.

[0038] The outer-flame structure 60 forms the nose field 75 which projects from a corner of the massive field 110 which the straight line opened generally, and the massive field 110. The external plastics frame member 78 is fabricated and forms the straight tubing 93 with which internal opening or a slot 94 (henceforth a slot 94) is formed in inside. The slot 94 of straight tubing is connected with the TIJ print head 76 currently fixed by crossing the outer edge of a slot 94. Ink flows through the slot 94 of straight tubing, and supplies ink to the TIJ print head 76. If the globule of ink is extruded outside through a print head nozzle, ink will flow from the ink reservoir 62 through the straight tubing 93 via the fluid path generally shown by arrow heads 97 and 99, and will supply available ink supply to the TIJ print head 76.

[0039] The internal plastics frame member 68 was equipped with the support rib 120 which crosses the throat of the nose field 75 further and projects, and has separated the nose field from the main ink reservoir area 62. Rectangular ***** 122 is generally formed of the envelopment structure of the internal plastics frame member 68 which projects between the support rib 120 and internal opening of the slot 94 of straight tubing.

[0040] The 1st and 2nd ink reservoir film 64 and 66 is attached in the internal plastics frame member 68 according to a heat caulking, adhesives, or other joint processes, and forms leakage-proof closure between the internal plastics frame member 68, 1st, and 2nd ink reservoir film 64 and 66. The 1st and 2nd ink reservoir film 64 and 66 is made from the plastics of the ingredient which is impermeability and manufactures the internal plastics frame member 68 to the ink which it is going to store in the interior of the ink reservoir 62, and the suiting ingredient. The suitable ingredient for the 1st and 2nd ink reservoir film 64 and 66 is ethylene-vinyl acetate (EVA). The ink distribution system has separated the 1st and 2nd ink reservoir film 64 and 66 for the spring 74 which supplies separating power to two opposite piston plates 72A and 72B in preparation for the inside of the ink reservoir 62. A spring and a piston element maintain the pressure concerning the ink in an ink reservoir to negative, and he is trying for ink not to overflow from the TIJ print head 76. The atmospheric pressure concerning the 1st and 2nd ink reservoir film 64 and 66 produces compression of a spring, and draws the piston plates 72A and 72B to the more nearly mutual one as ink is consumed from an ink reservoir.

[0041] The 1st and 2nd ink reservoir film 64 and 66 has spread over the straight tubing field, and in this example, the heat caulking of it is carried out along the marginal fields 68A, 68B, and 68C (drawing 5), and it is maintaining closure of the film which meets around the nose field 75. The 1st and 2nd ink reservoir film 64 and 66 is not closed to the field of the support rib 120. The separators 69A and 69B which constitute the internal plastics frame member 68 separate the 1st and 2nd ink reservoir film from the area of the support rib 120, and hold it, and it is made for the 1st and 2nd ink reservoir film not to curtain toward support rib structure, and, thereby, they have shut the flow of the ink from the ink reservoir to the straight tubing 93.

[0042] An air check valve is prepared in the passage between the TIJ print head 76 and the ink reservoir 62, and he is trying for air bubbles not to advance into the ink reservoir 62 from the TIJ print head 76. This air check valve also performs the function of the filter a particle contamination flows from the ink reservoir 62 to the TIJ print head 76, and it is made for the nozzle of a TIJ print head not to block. In this example, the air check valve equips the both sides of the internal plastics frame member 68 with every two one valve portion material 90 and 92. The valve portion material 90 and 92 is respectively constituted by this model example from some networks of the stainless steel woven by the precision, and that edge is attached in the internal plastics frame member. The network is equipped with the path dimension of 15 microns

of nominal ratings between lines from the adjoining network, and the typical thickness of the network which accomplishes valve portion material is less than 0.005 inches. In this example, each valve portion material 90 and 92 is a square, and has covered abbreviation 1cmx1cm area. It is suitable for the network marketed by the basis of a brand name "RIGIMESH-J" (RIGIMESHU-Jay) from in guru tool [of Oregon Eugene (Eugene)] - and - die (Engle Tool and Die) functioning a check valve. While ink can pass through the path of a network, the magnitude of the path of a network is small enough so that it may not pass through the path of a network where the air bubbles under atmospheric pressure are usually damp in ink. Although the pressure of air bubbles required for making air bubbles pass a network is about 30 inches of water columns in this example, as for this, it is higher than the pressure which the pen cartridge 50 receives under each condition of typical storage, handling, and actuation enough. Consequently, a network functions the air check valve to this pen cartridge 50.

[0043] The 2nd function realized by valve portion material with a network is a function of a particle filter, and it is made for a no less than 15 microns small particle not to pass a network. It is known to use the network of the magnitude of this mesh opening for the particle filter of the ink reservoir containing a bubble of an aeration mold. There is no need for an air check valve in such an ink reservoir.

[0044] The valve portion material 90 and 92 with a network is crossed, and pressure drawdown exists. If the magnitude of network opening is too small, the ink which flows through a network will become inadequate and a TIJ print head will become empty tufted voice. Two valve portion material 90 and 92 is adopted so that sufficient ink may flow into a slot 94 certainly from the ink reservoir 62.

[0045] Drawing 4 and drawing 5 show the nose field 75 of the TIJ pen cartridge 50. Drawing 4 is the sectional view taken along with the line 4-4 of drawing 3 . Drawing 5 is drawing of the nose field which does not have covering and the valve portion material 90 and 92 in a predetermined location. The external plastics frame member 78 is equipped with the tabs 78A and 78B which oppose the sense in one pair, and this performs support for the part of the internal plastics frame member 68 fabricated around the inner circumference of the nose field 75. Tabs 78A and 78B serve also as a core form for fabricating the internal plastics frame member 68. The internal plastics frame member 68 forms ***** 122, and the straight-line part of the internal plastics frame member 68 has spread around the circumference of ***** 122. The internal plastics frame member is formed of the marginal fields 68A-68D. As shown in drawing 3 , the width of face of the internal plastics frame member 68 has specified the width of face of ***** 122. The marginal fields 68A-68D follow, and form the aperture to ***** 122 in each covering pair opposite side of the internal plastics frame member 68. Each side face of ***** 122 which spreads at right angles to the flat surface of coverings 70 and 80 is formed by the plastics which constitutes the internal plastics frame member 68.

[0046] Working and air bubbles may be accumulated into ***** 122. The printer which is installing the TIJ pen cartridge 50 can be equipped with the priming station for adding a vacuum to a TIJ print head, pulling out air bubbles through a TIJ print head, pulling out ink from an ink reservoir, and filling the slot and ***** 122 of straight tubing. Such a priming station is known at this contractor.

[0047] The internal plastics frame member 68 is fabricated so that the thin lip 124 which projects from the marginal fields 68A-68D, and spreads around the circumference of the internal plastics frame member 68 may be formed. Such a lip 124 is formed in each covering pair opposite side of

the internal plastics frame member 68. Only a lip 124 can be seen by drawing 5. During the heat caulking actuation performed to attach the valve portion material by the network screen, the heated mold member is installed in the valve portion material upper part, and is pushed downward by the force toward valve portion material. The temperature of a mold member flows the plastic material which forms a lip 124 into the adjoining clearance between softening or the network with which some of melting plastics accomplishes valve portion material since it is enough to carry out melting. If a mold member is removed and plastics is cooled, valve portion material will be firmly attached in the internal plastics frame member 68 around all the circumferences of the aperture to ***** 122.

[0048] Drawing 6 - drawing 9 show the location and structure of the ink restoration port 130 of the TIJ pen cartridge 50. As shown in drawing 6, in this example, the ink restoration port 130 is established in even flat-surface 60A of the outer-flame structure 60 which adjoins the nose field 75 of a TIJ pen cartridge. Ink is put in an ink reservoir via the ink restoration port 130, and the ink restoration port 130 is closed by inserting the stainless steel ball 132 after that.

[0049] Although the external plastics frame member 78 is fabricated so that opening of a circular cross section may be formed, the diameter of the opening is changing rapidly to the diameter of the larger one of the field 136 which adjoins flat-surface 60A from the diameter of the smaller one of the field 134 where the stainless steel ball 132 is supported. In this example, the diameter of the stainless steel ball 132 is 0.187 inches (4.76mm), the diameter of the smaller one in the field 134 of the external plastics frame member 78 is 0.236 inches (6.0mm), and the diameter of the larger one in the field 136 of the external plastics frame member 78 is 0.283 inches (7.2mm).

[0050] During the period which fabricates the internal plastics frame member 68 in the external plastics frame member 78 manufactured beforehand, melting plastics passes along opening formed in the external plastics frame member 78 as an ink restoration port, and forms the restoration port structure which consists of an internal plastics frame member 68 which is not flowing the surroundings of the shaping pin inserted there. Thus, melting plastics flows the surroundings of the ingredient which forms the external plastics frame member 78 in a field 134, and forms back **** on it. The internal plastics frame member 68 moreover formed in this way forms the ink restoration port 130 connecting with the ink reservoir 62. The diameter of the ink restoration port 130 is making the taper from the 1st diameter of opening which adjoins a front face to the 2nd [of 138 which adjoins the small ink reservoir 62 on parenchyma from the diameter of the stainless steel ball 132] small diameter. In this model example, the 1st diameter is 0.179 inches and the 2nd diameter is 0.120 inches.

[0051] In order to put ink in the ink reservoir 62, it is made a vertical position and a TIJ pen cartridge holds the nose field 75, as shown in drawing 6. An ink restoration needle gets down into an ink reservoir through the ink restoration port 130, and it almost comes to contact the bottom of an ink reservoir. ink is possible for this -- it is carried out so that minimum distance drop may be carried out. That is because some ink will foam and Ushiro's priming will become difficult by that cause, if ink falls. Next, ink is packed to the point that suck up to an ink reservoir of a TIJ pen cartridge, and the ink in an ink reservoir almost contacts inside an ink restoration port through an ink restoration needle with a means. An ink restoration needle is pulled out from a pen at this point, and the stainless steel ball 132 is placed on ink restoration opening. Since a stainless steel ball must carry out the variation rate of some of plastic material which encloses the ink restoration port 130, it fits in firmly into opening 138 for the magnitude to an ink restoration port. The stainless steel ball 130 is stuffed into the ink restoration port 130 next by pushing so

that a tool may contact a bore exactly by the opening 138 of the bottom of ink restoration HOTO 130 in a tool 140 (drawing 9). Although close requires ink for an ink reservoir of a TIJ pen cartridge at this point, the air path which passes along a print head nozzle from on the free surface of ink exists, and this must be removed in order to secure the back pressure of the beginning of a TIJ pen cartridge.

[0052] In the TIJ pen cartridge 50, air is sampled from a TIJ pen cartridge in the condition of 30 degrees of having leaned the degree of angle so that the peak may be the nose field 75. Since air floats to the peak which is a nose field then and becomes easy to sample air by the etching primer from a TIJ pen cartridge by that cause, this is performed. Next, a suction head is installed in the nozzle field upper part of a TIJ pen cartridge, and carries out vacuum suction. The level of ink goes up, a filter with the network which accomplishes valve portion material is wet thoroughly, and, finally the track progresses to its whole to a print head nozzle as a vacuum removes air. The ink of a known amount was lengthened through the nozzle and this process has characterized it as securing the initial back pressure of a TIJ pen cartridge to -1 inch of a water column. Since the discharge preparations of the TIJ pen cartridge are made, the top face of a print head is washed using beautiful water and an air knife, and the surplus ink from a priming process is removed. Any sense can be rotated after the TIJ pen cartridge has held ink in a TIJ pen cartridge, of course, since it finished making the discharge preparations of the TIJ pen cartridge.

[0053] Drawing 10 and drawing 11 isolate for it and show the external plastics frame member 78 which constitutes the TIJ pen cartridge 50. Although the external plastics frame member 78 has presented the external flat side 142 by drawing 11 especially, it turns out that the medial surface of the external plastics frame member 78 presents some stairways which increase the thickness of the external plastics frame member 78, and the plateau 146 is formed. The rib form 144 was formed along the core of the external plastics frame member 78 which projects from a plateau 146, and is equipped with the undercut side faces 144A and 144B. the rib form 144 is shown in drawing 10 -- as -- a part of side face of the external plastics frame member 78 -- or all were boiled for almost, and it has met and spread.

[0054] Although drawing 12 is a side elevation corresponding to drawing 10 , the internal plastics frame member 68 fabricated on the external plastics frame member 78 is shown. The external plastics frame member 78 has covered breadth and the rib form 144 along the plateau 146. The undercut side of a rib form serves as a locking means to lock the internal plastics frame member 68 in the internal plastics frame member 68. In this example, the thickness of the internal plastics frame member 68 is T (0.059 inches), and the width of face in the area shown in drawing 13 is W (0.354 inches). The side faces 148 and 150 of the internal plastics frame member 68 generally prolonged at right angles to the external plastics frame member 78 are the front faces in which the 1st and 2nd ink reservoir film 64 and 66 can be attached.

[0055] The ingredient which forms the internal plastics frame member 68 is equipped with contraction when cooling from a melting condition. This ingredient is fabricated inside the external plastics frame member 78, and it tends to contract so that it may separate from the external plastics frame member 78, as it cools. In order to keep the internal plastics frame member 68 attached to the external plastics frame member 78, an internal plastics frame member is fabricated on the rib form 144 of the undercut currently fabricated as a part of external plastics frame member 78. It is locked by these rib form 144 on the external plastics frame member 78, and reverse is pulled apart from the external plastics frame member 78 by the force of the ingredient which forms the internal plastics frame member 68 by that cause by contraction of the

ingredient as the ingredient which forms the internal plastics frame member 68 cools. The rib form 144 for the lock of a graphic display is equipped with the simple cross section which is easy to fabricate.

[0056] soft polyolefine -- a mixture can be used as an ingredient of the internal plastics frame member 68. it -- this polyolefine -- a mixture -- NORYL It is because pasted up chemically on the surface of the ingredient, and it has very low (almost equal [inch] in 2.5 mils /of NORYL) contraction, so the force produced in a contraction process is lower than the pure polyethylene which is about 20 mils/inch.

[0057] Drawing 14 and drawing 15 show the structure of the internal plastics frame member 68 in a nose field, and the external plastics frame 78 further to a detail. The ingredient of the internal plastics frame member 68 flows TabA [78] and 78B top, and bonnet and rib 93A locks the straight tubing 93.

[0058] Drawing 16 is the sectional view taken along with the line 16-16 of drawing 6 . The element which forms an ink reservoir can be seen here. anchoring of the 1st which is spring *** to the pair opposite side sides 148 and 150 of the internal plastics frame member 68, and the 2nd person ink reservoir film 64 and 66 is shown. Especially drawing 17 is the enlarged drawing showing heat caulking anchoring to the side face 148 of the internal plastics frame member 68 of the 2nd ink reservoir film 66. It is common knowledge in the plastics industry in itself [heat caulking].

[0059] Drawing 18 and drawing 19 show two examples alternative to being the lock form which can form instead of [of the rib form 144] in the inner surface of the external plastics frame member 78. Therefore, drawing 18 shows external plastics frame member 78a which has adopted the small handle-like form on the parenchyma which has the opening 160 into which melting plastics flows, when fabricating lock form 144a, i.e., internal plastics frame member 68a.

Drawing 19 shows external plastics frame member 78a equipped with lock form 144a in which the round undercut opening 162 is formed. Melting plastics flows into the undercut opening 162, when fabricating internal plastics frame member 68a.

[0060] The approach of fabricating the internal plastics frame member 68 to the external plastics frame member 78 is described at the quoted United States patent application number 07th / No. 853,372. If it states to whether it is short, denaturation polyphenylene oxide 78, i.e., the external plastics frame member of the 1st molding material, will be manufactured with plastics injection molding. This external plastics frame member 78 is called "1st shot." The 1st shot is poured into the 2nd mold next, and the 2nd molding material is fabricated on it here. if this the "2nd shot" is cooled -- being certain -- extent contraction is carried out.

[0061] I hear that the internal plastics frame member 68 can be made from the ingredient (polyolefine -- it is like a mixture) softer than the engineering plastic of the external plastics frame member 78 with ductility which works also as attenuation material partly, and there is the advantage of two ingredients which constitute the frame of the TIJ pen cartridge 50 about it, when this pen cartridge 50 is dropped. This tends to prevent a crack, the tear of the film, and the breakages on other. Moreover, although the ingredient with the soft ductility of the internal plastics frame member 68 resembles rubber from the engineering plastic, it cannot produce stress cracking easily. If the ingredient of a polyethylene system like polyolefine is used for manufacturing the internal plastics frame member 68, there will be still more nearly another profit that moisture permeability is low, and chemical compatibility with the chemicals which constitute the ink which reverse maintains the contents of the ink in an ink reservoir to leakage or

evaporation, and uses them for a TIJ pen cartridge by that cause will be maintained. The valve portion material 90 and 92 as a filter can be easily attached in such an ingredient to the internal plastics frame member 68 in contrast with an engineering plastic. Because, the ingredient of a polyolefine system has low heat caulking temperature, it is easy to carry out ** ON of the ingredient to the network of a filter, and, thereby, positive junction is performed between the internal plastics frame member 68, and the air check valve / valve portion material 90 and 92. [0062] It is necessary to make the area of the TIJ print head 76 and a filter element, i.e., the TIJ pen cartridge between the valve portion material 90 and 92, there be no particle contamination of sufficient magnitude to block the nozzle of a print head at the time of shaping of the internal plastics frame member 68 and the internal plastics frame member 78. The core pin which form a straight tubing room in the case of the insert molding of a TIJ pen cartridge which be being describe at the United States patent application number 07th under quoted connection / No. 853,872 need to engage with the ingredient of the 1st shot which form the external plastics frame member 78 , and need to make sufficiently tight the fuse ingredient of the 2nd shot which be about closure under the pressure which form the internal plastics frame member 68 making it not enter . Since engagement of the core pin inside the straight tubing 93 may produce the particle from which an operation of engagement wears down the wall of the ingredient of the 1st shot, remains behind, and produces the manifestation of contamination, it is a pollution source. Cutoff of a core pin and the area of wiping are the minimum by the design of the core pin 170 shown in drawing 20 . In this design, the ingredient of the 2nd shot which forms the internal plastics frame member 68 is made to back-**** the inside of the slot 94 of straight tubing selectively, wipes it off, and lessens the operation. Both drawing 20 shows two half-molds 174 and 176 which bring on the external plastics frame member 78, and form the cavity of the mold for the 2nd-shot shaping of an internal plastics frame member in the nose field 75. The slot pin 172 crossed the half-mold and has fitted in. The core pin 170 as a mold cavernous pin was inserted in Mizouchi of straight tubing, and has received the head into the crevice formed in the slot pin 172. The core pin 170 is a taper and forms space in a circle above shoulder 170A between a core pin and the slot of straight tubing formed in the external plastics frame member 78. A core pin 170 fits into Mizouchi of straight tubing under shoulder 170A firmly, and forms plug area 170B by which it is made for the ingredient of the 2nd shot not to flow into plug field 170B of an area during shaping. The 2nd shot ingredient can flow into space in a circle by this pin configuration, and wrap back **** can be caudad formed for the interior of straight tubing to plug field 170B. The front faces 79A and 79B of the external plastics frame member 78 serve also as a cutoff side where the front face of a half-mold contacts, and it is made for the 2nd shot ingredient not to flow through junction between front faces 79A and 79B and a half-mold.

[0063] Other approaches of making the problem of contamination as small as possible are automating the charge to the mold of the 2nd shot opportunity of the external plastics frame member 78 of the 1st shot. Although this automation uses a robot charging machine, this is a customary thing in the shaping industry which installs an external plastics frame member in the mold of the 2nd shot in advance of shaping. A robot can be used for being able to insert an external plastics frame member in a robot charging machine by the automatic feeder system by hand, or selecting an external plastics frame member out of the 1st shot making machine, and installing them in the 2nd making machine. The much more good accommodation environment which is useful to all of these activities of automation cleaning components is considered.

[0064] One making machine can be equipped with a means to fabricate the 1st ingredient, and

can move the just [of it] fabricated shot to the predetermined location to the barrel of the 2nd ingredient, and these two ingredients, i.e., an external plastics frame member, and an internal plastics frame member can also make it by the two-shot fabricating method which subsequently fabricates the 2nd ingredient and completes components. Such a two-shot shaping process is known in this industry.

[0065] In above-mentioned shaping, point ***** of the engineering plastic of an ingredient and the external plastics frame member 78 which has the melting temperature of the higher one is carried out by the 1st shot, and the external plastics frame member 78 is formed. the ingredient which has the melting temperature of the lower one, and polyolefine -- it assists forming the cavity of the mold of the 2nd shot using the external plastics frame member already fabricated in the mixture or the polyethylene system ingredient, and the internal plastics frame member 68 is formed in a degree. Instead, this shaping process can be made into reverse and melting temperature can fabricate the ingredient of the higher one in an insert molding process on an ingredient with lower melting temperature. The interlocking form between the internal plastics frame member 68 and the external plastics frame member 78 is formed on the 1st shot 68, i.e., an internal plastics frame member, using sufficient undercut to lock both two ingredients. It is necessary to stop the temperature of a mold to the bottom near the melting point of the 1st shot of low temperature. In the case of a certain engineering plastic, it may become still more difficult for this to fabricate them. Moreover, since the plastics of the 2nd shot is fabricated [be / it / under / of a mold / reaching] on the plastics of the 1st shot, the 1st shot is fused along the interface of plastics. A process condition must be washed away, when the 1st shot's maintains the integrity, and it is only influenced along an interface and the 2nd shot's is fabricated on the 1st shot.

[0066] Drawing 21 shows such an insert molding process in the area of straight tubing of the TIJ pen cartridge 50. The internal plastics frame member 68 is first fabricated in the mold of the 1st shot. Next, the front face of the internal plastics frame member 68 is used for forming some of mold front faces of the 2nd shot, and the external plastics frame member 78 of an external engineering plastic is fabricated on the internal plastics frame member 68. The core pin 180 and the mold cap 182 form the slot of internal straight tubing, and the top face of a straight tubing area. The outside ring of 184 of an engineering plastic is formed on the internal plastics frame member 68 of the 1st shot plastics, and the compression ring which compresses the low temperature ingredient of the internal plastics frame member 68 is formed on inside straight tubing formed of the 2nd shot. The 1st shot ingredient is compressed toward the 2nd shot by 186 which forms straight tubing for the 1st shot ingredient as the ingredient of the 2nd shot cools.

[0067] Drawing 22 shows the insert molding configuration alternative to receiving straight tubing in the condition of having fabricated the ingredient of the temperature of the lower one first. Since the 2nd shot does not form a compression ring in the surroundings of the low temperature ingredient which encloses straight tubing here, the 2nd shot ingredient fuses an interface and association between two ingredients only depends it on chemical association between 2 ingredients supported when helping to produce association better than the case where a low temperature ingredient is fabricated at the end. In this case, it is cooled as a mold is buried, and since the directions of the temperature of the 2nd shot ingredient are a high thing and its heat capacity, the 2nd shot is not so hot as it is possible in this case in all the areas in alignment with junction. However, the configuration of drawing 21 is superior to the thing of drawing 22 . It is because closure of both that the former configuration is chemical and a machine target is

produced.

[0068] There are some advantages in such an insert molding process of the high temperature ingredient on low temperature plastic material. The main profits are in the area of straight tubing. The core pin 180 which fabricates straight tubing opening to a TIJ print head in shaping of the engineering plastic material of the 2nd shot does not have the problem of above-mentioned wear that what is necessary is just to retreat from two shot of ** after shaping therefore. In this case, although the mold cap 182 must retreat and this may produce wear, since the hole where it retreats is formed of the completely same core pin, fitting between a core pin and straight tubing is dramatically exact, and wear becomes less than the case where an engineering plastic is the 1st shot ingredient. In that case, a core pin is discharged from the mold of the 1st shot, subsequently the external plastics frame member 78 is discharged from a mold, it contracts, an external plastics frame member is processed, and the distortion of straight tubing is produced. At the end, another straight tubing core pin is prepared, and it pushes into the slot of straight tubing of the external plastics frame member 78. In the current case which carries out insert molding of the ingredient with lower temperature first, the ingredient of the 1st shot does not contact a core pin 180. Although it contracts on the internal 1st shot ingredient and produces junction just as the engineering plastic of the 2nd shot cools, I hear that other advantages of this approach tend to be pulled apart from the 1st shot inside the boundary of the junction with two shots far from straight tubing in law of the 2nd-shot natural contraction which forms an engineering plastic first, and there are.

[0069] Other shaping processes which can be used for manufacturing the internal plastics frame member 68 and the external plastics frame member 78 are 2 shaping processes which fabricate engineering plastic material with higher temperature on polyolefine with lower temperature. If an ingredient with lower temperature is fabricated inside an ingredient with higher temperature, the part of the 1st shot must be contracted and separated from there, and it must carry inside a core with the inclination which becomes loose as described at the United States patent application number 07th / No. 853,372. In this new two-shot shaping process, it fabricates on the core which contracts the 1st shot firmly on it, subsequently to the 1st shot top, the 2nd shot is fabricated in it, and the 2nd shot is also strongly contracted on the 1st shot in it.

[0070] Drawing 23 shows the example instead of the nose field of a TIJ pen cartridge in the form before fabricating the internal plastics frame member 68 on the internal plastics frame member 68 of an engineering plastic. By nose field 75c, external plastics frame member 78c forms fluid straight tubing 93c to which the interior in which **** 94c which is internal opening prolonged to opening formed in the outside surface of external plastics frame member 78c through straight tubing is formed stood straight. it comes out through this slot that ink flows from an ink reservoir to the TIJ print head which will be installed in a nose field.

[0071] Drawing 23 shows the open field 202 which encloses straight tubing 93c of the fluid which projects upward inside external plastics frame member 78c. One pair of rib 93Ac(s) detached and prepared and 93Bc(s) project from the lateral surface of the straight tubing 93. A stanchion 204 crosses the throat of nose field 75c, and is formed.

[0072] If drawing 24 is referred to shortly, external plastics frame member 78c is illustrated in the condition that internal plastics frame member 68c is fabricated by the inner surface of external plastics frame member 78c. The ingredient which forms an internal plastics frame member is fabricated around straight tubing 93c, without covering slot 94c, and the front face on which the ink reservoir film which is spring bag film film can be closed is offered.

[0073] It is understood that an above-mentioned example is mere instantiation of the possible specific example which can express the principle of this invention. This contractor can guess other configurations easily according to those principles, without deviating from the range and pneuma of this invention.

[0074] Although each example of this invention was explained in full detail above, in order to make an understanding of each example of this invention easy here, it summarizes for every example and enumerates below.

[0075] 1. In Ink Cartridge for Printers Equipped with Ink Reservoir The frame structure object which consists of the outer-flame member manufactured from the 1st **** plastic material, and the inner flame member manufactured from the 2nd plastic material, It is formed from the 3rd plastic material and joined to said inner flame member. With said frame structure object the 1st which forms said ink reservoir, and the 2nd impermeable film -- since -- it is constituted and said 2nd plastic material is an ink cartridge which suits said 3rd plastic material and is enabling leakage-proof junction over said inner flame member of said impermeable film.

[0076] 2. Said 2nd plastic material consists of polymer mixing constituents which consist of at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group who consists of the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene, and (A) and (B) are ink cartridges given in said 1 which is a different thing.

[0077] 3. (A) given in said 2 is low density polyethylene.

[0078] 4. (A) given in said 2 is the copolymer of ethylene and the alpha-olefin which has the carbon atoms from about 4 to about 18.

[0079] 5. (B) given in said 2 is the random copolymer of a propylene and ethylene.

[0080] 6. The melt flow index of (B) given in said 2 is about 3 to about 45.

[0081] 7. (A) given in said 2 exists in the amount from about 60 % of the weight to about 90 % of the weight, (B) given in said 2 exists in the amount from about 10 % of the weight to about 40 % of the weight, and the weight percent in this case is based on what mixed (B) with (A) for it.

[0082] 8. Furthermore, the (C) bulking agent can be included in a polymer mixing constituent given in said 2.

[0083] 9. Furthermore, the (d) stabilizer can be included in a polymer mixing constituent given in said 2.

[0084] 10. at least one of a copolymer with the alpha-olefin in which the 2nd plastic material given in said 1 has (A) ethylene and the carbon atoms from about 4 to about 18, and the random copolymers of the (B) propylene and ethylene -- since -- it is the ink cartridge which consists of polymer mixing constituents which change.

[0085] 11. From about 65 % of the Weight to about 85% of the Weight of at Least One Polymer Chosen from Group to whom 2nd Plastic Material of Publication Changes from Copolymer of (A) Low Density Polyethylene and Ethylene, and Alpha-Olefin to Said 1 From about 15 % of the weight to and about 35% of the weight of at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene since -- it consists of constituted polymer mixing constituents, and the melt index of a polymer is about 5 to about 15 in this case, and (A) is an ink cartridge whose (B) is a different thing.

[0086] 12. It is the Approach of Forming Leakage-proof Junction between 1st [for Ink Cartridge Pens of Printer], and 2nd Ingredient Which Can be Fabricated. The process fabricated in the 1st predetermined structure equipped with the cavity which forms the periphery of internal straight

tube part material for said 1st ingredient, The process which pours in the ingredient which installs said 1st structure into a mold and said 2nd [the] can fabricate, It is the process which pours into said mold the ingredient which said 2nd [the] in a melting condition can fabricate. In this case, the process which said 2nd ingredient buries the periphery of said cavity, fabricates it to said 1st structure, and forms the periphery of said straight tube part material, Said ingredient which the 2nd can fabricate was made to cool, and it has accomplished according to the process which forms leakage-proof closure by that cause between said 1st surrounding ingredient and 2nd surrounding ingredient of said straight tube part material.

[0087] 13. At Least One Polymer Chosen from Group to whom Said Ingredient Which the 2nd Can Fabricate Changes from Copolymer of (A) Polyethylene and Ethylene, and Alpha-Olefin, and at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene -- since -- it consists of constituted polymer mixing constituents, and is an approach given in said 12 which is that from which (A) and (B) differ in this case.

[0088] 14. Outer-Flame Structural Member Made from 1st **** Plastic Material, And it is the approach of manufacturing the ink cartridge of the printer which consists of frame structure objects which consist of the inner flame member made from the plastic material of back ***** 2 in said a part of external member. In the approach characterized by said 1st ingredient having fixed contraction at the time of cooling of this ingredient The process which injection molds said 2nd ingredient in said internal back **** member, and said internal back **** member are installed into a mold. It is the process which injection molds said outer-flame member around said internal member. The process in which the front face of said internal member forms a part of mold cavity which will pour in said 1st ingredient, The process which pours in said 1st ingredient in a melting condition into said mold cavity currently formed of said mold and said internal member, the process make cool said 1st ingredient, contracts said 1st ingredient around said internal member, and make it said whose external member suit to the surroundings of said internal member just -- since -- it is the approach constituted.

[0089] 15. at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group to whom said 2nd plastic material changes from the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene -- since -- it consists of polymer mixing constituents constituted, and it is an approach given in said 14 which is that from which (A), and (B) differ in this case.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective view of a TIJ pen cartridge which carries out this invention, and is shown in the form which fractured the covering.

[Drawing 2] It is the enlarged drawing of the nose field of the TIJ pen cartridge of drawing 1 .

[Drawing 3] It is the sectional view of the TIJ pen cartridge of drawing 1 taken in the die-length direction through the nose field of a TIJ pen cartridge.

[Drawing 4] It is the fracture sectional view of the nose field of the TIJ pen cartridge of drawing 1 .

[Drawing 5] It is the side elevation of the nose field of the TIJ pen cartridge of drawing 1 taken

before installation of an air check valve.

[Drawing 6] It is the perspective view of the TIJ pen cartridge of drawing 1 .

[Drawing 7] It is the sectional view taken along with the line 7-7 of drawing 6 .

[Drawing 8] It is the sectional view taken along with the line 8-8 of drawing 7 .

[Drawing 9] Although it is the same sectional view as drawing 7 , insertion of a closure ball is shown.

[Drawing 10] It is the side elevation of the external plastics frame member which constitutes the TIJ pen cartridge of drawing 1 .

[Drawing 11] It is the sectional view taken along with the line 11-11 of drawing 10 .

[Drawing 12] It is the side elevation of the exterior which constitutes the TIJ pen cartridge of drawing 1 , and an internal plastics frame member.

[Drawing 13] It is the sectional view taken along with the line 13-13 of drawing 12 .

[Drawing 14] It is the sectional view taken along with the line 14-14 of drawing 12 .

[Drawing 15] It is the sectional view taken along with the line 15-15 of drawing 12 .

[Drawing 16] It is the sectional view taken along with the line 16-16 of drawing 6 .

[Drawing 17] It is the enlarged drawing of the field inside the circle 17 of drawing 16 .

[Drawing 18] It is the perspective view showing the approach alternative to locking an internal plastics RIFUREMU member in the external plastics frame member which constitutes the TIJ pen cartridge of drawing 1 .

[Drawing 19] It is the perspective view showing an option in the pan which locks an internal plastics RIFUREMU member in the external plastics frame member which constitutes the TIJ pen cartridge of drawing 1 .

[Drawing 20] It is the sectional view showing shaping of 2nd shot back **** of straight tubing opening.

[Drawing 21] It is the sectional view showing the approach alternative to fabricating the exterior and the internal plastics frame member which constitute the TIJ pen cartridge of drawing 1 .

[Drawing 22] It is the sectional view showing an option in the pan which fabricates the exterior and the internal plastics frame member which constitute the TIJ pen cartridge of drawing 1 .

[Drawing 23] It is the fracture sectional view showing the example instead of the nose field of the TIJ pen cartridge of an external plastics frame member.

[Drawing 24] It is the side elevation showing the example instead of the nose field of the TIJ pen cartridge of an external plastics frame member.

[Description of Notations]

50 TIJ Pen Cartridge

60 Outer-Flame Structure

62 Ink Reservoir

64 1st Ink Reservoir Film

66 2nd Ink Reservoir Film

68, 68a, 68b, 68c Internal plastics frame member

76 TIJ Print Head

78, 78b, 78c External plastics frame member

90 92 Valve portion material

93 93c Straight tubing

120 Support Rib

130 Ink Restoration Port
132 Stainless Steel Ball

CORRECTION OR AMENDMENT

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[Procedure amendment 1]

[Document to be Amended] Description

[Item(s) to be Amended] The name of invention

[Method of Amendment] Modification

[Proposed Amendment]

[Title of the Invention] An ink cartridge and its fabrication approach

[Procedure amendment 2]

[Document to be Amended] Description

[Item(s) to be Amended] Claim

[Method of Amendment] Modification

[Proposed Amendment]

[Claim(s)]

[Claim 1] It is the ink cartridge for printers equipped with the ink reservoir, The frame structure object which consists of the outer-flame member manufactured from the 1st **** plastic material, and the inner flame member manufactured from the 2nd plastic material, the 1st which is formed from the 3rd plastic material, is joined to said inner flame member and forms said ink reservoir with said frame structure object, and the 2nd impermeable film -- since -- it constitutes -- having -- ****

Said 2nd plastic material is a polymer mixing constituent which suits said 3rd plastic material and enables leakage-proof junction over said inner flame member of said impermeable film. At least one polymer chosen from the group to whom this polymer mixing constituent changes from

the copolymer of (A) polyethylene and ethylene, and an alpha-olefin, And it mainly consists of at least one polymer chosen from the group who consists of the copolymer of (B) polypropylene and a propylene, and ethylene. (A) and (B) are an ink cartridge in which it differs and said 2nd plastic material has ductility still more softly and further rather than said 1st plastic material.

[Claim 2] (A) is a polymer mixing constituent according to claim 1 which is low density polyethylene.

[Claim 3] (A) is a polymer mixing constituent according to claim 1 which is the copolymer of ethylene and the alpha-olefin which has the carbon atoms from about 4 to about 18.

[Claim 4] (B) is a polymer mixing constituent according to claim 1 which is the random copolymer of a propylene and ethylene.

[Claim 5] The melt flow index of (B) is a polymer mixing constituent according to claim 1 which is about 3 to about 45.

[Claim 6] (A) is a polymer mixing constituent according to claim 1 on the basis of that to which it existed in the amount from about 60 % of the weight to about 90 % of the weight, (B) existed in the amount from about 10 % of the weight to about 40 % of the weight, and the weight percent in this case mixed (B) with (A).

[Claim 7] It is the approach of forming leakage-proof junction between the ingredient which the 1st can fabricate on the ink cartridge pens of a printer, and the polymer mixing constituent which the 2nd can fabricate,

The process fabricated to the 1st predetermined structure equipped with the cavity which forms the periphery of internal straight tube part material for said 1st ingredient,

The process which installs said 1st structure into a mold so that said polymer mixing constituent which the 2nd can fabricate may be poured in,

(A) The process which said polymer mixing constituent which consists of polymer mixing constituents which consist of at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group who consists of the copolymer of polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene, and is different from (A), and (B), and which the 2nd can fabricate prepares, the process which it is the process which pours into said mold said polymer mixing constituent in a melting condition which the 2nd can fabricate, and said 2nd ingredient buries the periphery of said cavity in this case, fabricates to said 1st structure, and forms the periphery of said straight tube part material -- and

An approach including the process which is made to cool said polymer mixing constituent which the 2nd can fabricate, and forms leakage-proof closure by that cause between said 1st surrounding ingredient and 2nd surrounding ingredient of said straight tube part material.

[Claim 8] Said polymer mixing constituent was chosen from the group who consists of the copolymer of (A) polyethylene and ethylene, and an alpha-olefin. Were chosen from the group who consists of the random copolymer of at least one polymer from about 60 % of the weight to about 90 % of the weight, (B) polypropylene and a propylene, and ethylene. The melt flow index from about 10 % of the weight to about 40 % of the weight is about 3 to about 45. It is the approach according to claim 7 mainly consist of at least one polymer and a stabilizer, and said 2nd plastic material has ductility still more softly and further rather than said 1st plastic material.

[Claim 9] Said polymer mixing constituent was chosen from the group who consists of the copolymer of (A) low density polyethylene and ethylene, and the alpha-olefin that has the carbon atoms from about 4 to about 18. Were chosen from the group who consists of the copolymer of

at least one polymer from about 65 % of the weight to about 85 % of the weight, (B) polypropylene and a propylene, and ethylene. It is the approach according to claim 8 it mainly consists of at least one polymer from about 15 % of the weight to about 35 % of the weight, and the melt flow index of polymer mixture is about 5 to about 15.

[Claim 10] (A) is the approach according to claim 9 it is low density polyethylene and (B) is polypropylene.

[Claim 11] It is the approach of manufacturing the ink cartridge of the printer which consists of frame structure objects which consist of the outer-flame structural member made from the 1st **** plastic material characterized by having fixed contraction at the time of cooling, and the inner flame member made from back ***** and a polymer mixing constituent in said a part of external member,

(A) The process for which said different polymer mixing constituent from (A) and (B) is prepared including at least one polymer chosen from the group who consists of the copolymer of at least one polymer chosen from the group who consists of the copolymer of polyethylene and ethylene, and an alpha-olefin, (B) polypropylene and a propylene, and ethylene,

The process which injection molds said polymer mixing constituent to said internal back **** member,

It is the process in which it is the process which installs said internal back **** member into a mold, and the front face of said internal member forms a part of mold cavity which will pour in said 1st ingredient so that said outer-flame member may be injection molded around said internal member,

The process which pours in said 1st ingredient in a melting condition into said mold cavity currently formed of said mold and said internal member,

It is the approach of making cool said 1st ingredient and including the process contracts said 1st ingredient around said internal member, and make it said whose external member suit to the surroundings of said internal member just.